SERVICE MANUAL

HIGH－RESOLUTION DISPLAY MONITOR

MODEL　XC－3715C

Digitized by CASA Modular Systems (www.casa.co.nz)
Arranged and Edited by Garrett Withrow (gmwithrow@gmail.com)
2021

Contact me if you can make a small donation. I can forward it to CASA. The owner spent alot of time and effort obtaining this manual and he's in a tough financial spot. It would be very helpful.
Thank you all.

MITSUBISHI ELECTRIC CORPORATION
SEP. 1989

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X－RADIATION WARNING

The surface of picture tube may generate X-Radiation. Precaution during servicing, and if possible use of a lead apron or metal for shielding is recommended. To avoid possible exposure to X-Radiation and electrical shock hazard, the high voltage compartment and the picture tube shield must be kept in place whenever the chassis is in operation. When replacing picture tube use only designated replacement part since it is a critical component with regard to X-Radiation as noted above. The high-voltage specification is described on page 4.

CRITICAL COMPONENT REPLACEMENT WARNING

The components marked "⚠" are critical components for X-Radiation. When replacing these parts, use exactly the same one. If broken the critical component, please contact with qualified personnel of Mitsubishi Electric Corp. or the company which indicated on name plate.

注 意

本品は外国為替及び外国貿易管理法に定める戦略物資(又は役務) に該当するため、輸出する場合、同法に基づく輸出(又は役務取引) 許可が必要です。

CAUTION

These products or technologies are subject to Japanese and / or COCOM strategic restrictions, and diversion contrary thereto is prohibited.

TECHNICAL
SPECIFICATION
FOR
37" COLOR DISPLAY MONITOR
MODEL NO. XC-3715C

MITSUBISHI ELECTRIC CORPORATION
NAGASAKI WORKS

DOCUMENT NO. DSP-B0081

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7. ENVIRONMENTAL CONDITIONS
   - 7.1 Temperature
   - 7.2 Relative Humidity
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8. RASTER DISTORTION (Attachment)

9. OUTLINE (Attachment)

1. SCOPE

This specification contains specifications that establish the technical informations for high performance color display monitor which is operated with TV signals of NTSC, PAL, SECAM and with a any type of personal computer, such as IBM EGA, VGA, Mac II, and so on.
The color monitor is high resolution, multi-line rate (200~480 line) with auto-tracking (15.0~36KHz).

2. REGURATION

2.1	Safety	: UL478, CSA C22.2 No.154, IEC380
2.2	Electromagnetic	: FCC-Part 15 Subject J Class-A VDE0871 Class-B VCCI Class-1
2.3	X-ray radiation	: DHHS, HWS, PTB

3. ELECTRIC SPECIFICATION

3.1 CRT Description

1) Size : 37inch Diagonal
2) Deflection : 110 degree Diagonal
3) Electron gun : In-line type
4) Focusing method : Electro static
5) Focus lens : High focus voltage bi potential
6) Convergence method : Magnetic
7) Mask type : Black matrix
8) Trio Spacing : 0.85mm (center), 1.1mm (corner)
9) Array : Stripe
10) Phosphor type : B22

color	X	Y
Red	0.64	0.34
Green	0.30	0.60
Blue	0.15	0.060

(Typ. Value)

11) Phosphor persistence : Medium short
12) Light transmission : 47%
13) Face plate : Polished
14) Implosion Protection : Banded with mounting lugs

3.2 Power Supply

1) Voltage and Frequency : 100~120V / 220~240V ±10%, switchable 50 / 60 Hz
2) Power Consumption : 260 W
3) AC leakage current : less than 0.75mA

3.3 Video Signal Input

Input	Type of Signal	Sync. Signal	Input Impedance	Connector
VIDEO – 1 VIDEO – 2	Composite Video Signal NTSC (3.58MHz) M – NTSC (4.43MHz) PAL SECAM (Auto – detecting)		75Ω / High switchable	BNC RCA pin type
	Y / C Seperate signal (S – VHS) (VIDEO – 1 only)		75Ω	DIN – 4P
ANALOG – 1	R, G, B 0~0.7Vp-p	H, V separate 0.3~4Vp-p TTL (free – polarity)	75Ω / High switchable	BNC
		H, V composite 0.3~4Vp-p TTL (free – polarity)		
		Sync. on green 0.3V		
ANALOG – 2	R, G, B 0~0.7Vp-p	H, V separate 0.3~4Vp-p TTL (free – polarity)	Video Signal 75Ω Sync. Signal 75Ω / High	D – sub 15P
		H, V composite 0.3~4Vp-p TTL (free – polarity)		
TTL	R, G, B R, G, B, I R, R', G, G', B, B' Polality – Posi	H, V separate TTL (free – polarity)	Video Signal 330Ω to GND 470Ω to 5V Sync. Signal 330Ω to GND 470Ω to 5V	D – sub 9P
		H, V composite TTL (free – polarity)		

Note – 1) On VIDEO – 1 and VIDEO – 2, only one connector of BNC, RCA pin type, and DIN – 4P should be used.

Note – 2) TTL level

Low : 0~0.5V

High : 2.5~5.0V

3.4 Display Color

1) R, G, B analogue input : infinite
2) R, G, B TTL input
   (1) R, G, B input : 8 colors
   (2) R, G, B, I input : 16 colors
   (3) R, R', G, G', B, B' input : 64 colors

3.5 Deflection

1) Horizontal Deflection
   Scanning Frequency : 15~36 KHz (±0.5 KHz)
   Retrace Period : less than 5.3 μsec.
2) Vertical Defection
   Scanning Frequency : 40~120 Hz (±1 Hz)
   Retrace Period : less than 0.65 msec.

3.6 High Voltage : 32^{+1}_{-3} KV

3.7 Degaussing : Auto-degaussing by power on and manual degaussing.

3.8 Audio

1) Amplifire	Input	: 200mV RMS 47KΩ
	Line output	: 200mV RMS
	Control output	: 0~200mV RMS
	Output	: 2W/2W at 8Ω
2) Speakers	Size	: 7cm x 4cm
	Frequency	: 165~10KHz
	Output	: 1.6 W

(Internal speakers/external speakers changeable.)

4. SCREEN CHARACTERISTICS

4.1 Display Resolution : 640 dots × 200~480 lines

4.2 Display Size : Display size is pre-set as follows.
- NTSC/PAL/SECAM signal over scanning (5~10 %)
- EGA Mode (21.85 KHz) 645 ± 20mm × 485 ± 15mm
- VGA Mode (31.5 KHz) 645 ± 20mm × 485 ± 15mm

(Above figures are adjustable by user)

4.3 Misconvergence (As display size is 645mm × 485mm)

Center	:	1.0mm max.
Other	:	2.0mm max.

4.4 Geometric Distortion (As display size is 645mm × 485mm)

1) Trapezoid Distortion	:	Horizontal	1.5% max.
		Vertical	1.5% max.
2) Pincushion Distortion	:	Top & Bottom	2.5% max.
		Right & Left	2.5% max.
3) Barrel Distortion	:	Top & Bottom	2.5% max.
		Right & Left	2.5% max.
4) Parallelogram Distortion	:	±1% max.	
5) Rotation	:	±1% max.	
6) Non Linearity	:	Horizontal	10% max.
		Vertical	10% max.

5. CONTROL FUNCTION

5.1 Front Panel Control

1) Main Power Switch : Main power circuit on / off.

2) Power Switch : Stand – by power on / off.

3) Source Select Switch : Video source selection.
(VIDEO – 1 / 2, ANALOG – 1 / 2, TTL)

4) Brightness Switch : Brightness control with Up and Down switches.

5) Contrast Switch : Contrast control with Up and Down switches.

6) Volume Switch : Audio volume control with Up and Down switches.

7) Balance Switch : Audio balance control of left and right sound with Up and Down switches.

8) Set Switch : For adjusting following functions
- Cancel Coil adjusting
- Display Mode preset
- Color select for TTL input
- Color adjusting for Video input
- Sharpness adjusting for Video input
- Tint adjusting for Video input
- H – Width adjusting
- H – Phase adjusting
- V – Height adjusting
- V – Position adjusting

9) Call switch : Request for a indication on screen of video source and mode selected.

10) Display Off switch : Cancellation of the above indication.

11) Degauss switch : Manual degauss

5.2 Display Mode

The screen data which can be adjusted for each mode and each input are as following table.

INPUT / MODE	VIDEO-1/VIDEO-2		ANALOG-1		ANALOG-2		TTL	
	NTSC M-NTSC	PAL SECAM	1	2	1	2	1	2
H-WIDTH	○	○	○	○	○	△×7	○	△×2
H-PHASE	○	○	○	○	○	△×7	○	△×2
V-HEIGHT	○	○	○	○	○	△×7	○	△×2
V-POSITION	○	○	○	○	○	△×7	○	△×2
BRIGHTNESS	○	○	○		○		○	
CONTRAST	○	○	○		○		○	
COLOR	○	○	–		–		–	
TINT	○	–	–		–		–	
SHARPNESS	○	○	–		–		–	
COLOR SELECT	–	–	–		–		○	

1) User adjustable functions (marked ○)
User can adjust screen controls marked ○ by the switches of the front panel or a wireless remote control.

2) Marker pre-set functions (marked △)
Maker pre-set screen controls marked △ which are for compatibility with typical PC's (CGA, EGA, PGA, VGA, MAC-II).

3) Auto-detecting function on mode-2 of ANALOG-2 and TTL input, the typical PC's (CGA, EGA, PGA, VGA, MAC-II) are detected and the screen controls pre-set are applied automatically.

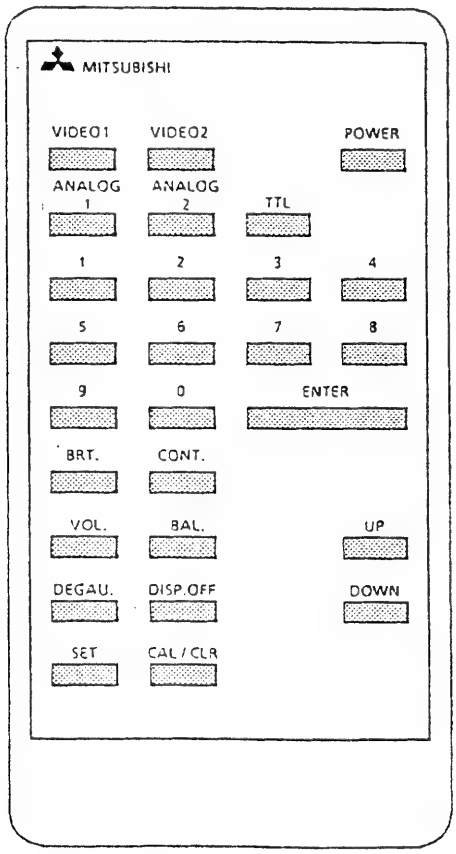
5.3 Wireless Remotecontrol (Model No. PCB-02)

1) Remote Control Method : Infrared

2) Power Source : DC 2.2V~3.3V
Battery UM-4 (1.5V) x 2

3) Controlable Distance : 6m min. (0°)
3m min. (±30°)

4) Control Switches
- Power Switch : Stand-by power on/off
- Video-1 Switch : Video source selection (Video-1 input)
- TTL Switch : Do. (TTL input)
- Ten Keys : Setting address No. on monitors and calling a monitor during multi-monitors controled by a wireless remote-controller.
- Other Switches : Same as 5.1 4)~11).



5.4 External Control

The following functions are controlled with TTL level signal via [EXT CONT] connector (D – Sub 9P) on back panel during the wireless remote – control disable.

- Video source selection — VIDEO – 1, VIDEO – 2, ANALOG – 1, ANALOG – 2, TTL
- Display mode selection — MODE – 1 / 2
- Wireless remote – control — Able / Disable
- Power (Stand – by power) — ON / OFF
- Manual degaussing

6. MECHANICAL SPECIFICATION

6.1 Enclosure

1) Enclosure Material

Bezel and Connetor – Panel	: P. S
Others	: Steel Plate

2) Color

Bezel	: 5Y5 / 0.5 and 5Y2 / 0.5
Others	: 5Y7 / 0.5
Connector – Panel	: 5Y8.5 / 0.5

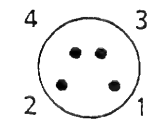
3) Dimensions

Width	: 865 mm
Height	: 742 mm
Depth	: 585 mm max.

4) Weight : 99 Kg approx.

6.2 Input / Output Connectors

1) Video – 1 input

Connector	Pin No.	Signal	
BNC	—	NTSC (3.58 MHz) M – NTSC (4.43 MHz) PAL SECAM	1.0 Vp-p, 75Ω Sync – nega.
RCA Pin			
DIN – 4P for S – VHS 	1	GND – (Y)	
	2	GND – (C)	
	3	Y	1.0 Vp-p, 75Ω, Sync – nega.
	4	C	Burst level 0.266 Vp-p, 75Ω

2) Video – 2 input

Connector	Pin No.	Signal	
BNC	—	NTSC (3.58 MHz) M – NTSC (4.43 MHz) PAL SECAM	1.0 Vp-p, 75Ω Sync – nega.
RCA Pin	—		

3) Analog – 1 input

Connector	Pin No.	Signal	
BNC	—	Red	0.7Vp-p, 75Ω / High
BNC	—	Green	0.7Vp-p, 75Ω / High
BNC	—	Blue	0.7Vp-p, 75Ω / High
BNC	—	H / COMP – Sync.	0.3~4Vp-p, 75Ω / High
BNC	—	V – Sync.	0.3~4Vp-p, 75Ω / High

4) Analog – 2 input

Connector	Pin No.	Signal	
D – Sub 15P	1	Red	0.7Vp-p, 75Ω
	2	Green	〃
	3	Blue	〃
	4	H / COMP – Sync.	0.3~4Vp-p, 75Ω
	5	V – Sync.	〃
	6	Half – Tone (Ym)	3V: – 3dB, 5V: – 6dB, 75Ω
	7	Video Output ※	1Vp-p, 75Ω
	8	PGA (400 / 480) Cont.	TTL
	9	GND – Red	
	10	GND – Green	
	11	GND – Blue	
	12	H / COMP – Sync.	TTL
	13	V – Sync.	〃
	14	Super Impose Control (Ys)	0~1.0V : Video – 1, 1.0~5V : Analog – 2 75Ω
	15	GND – Video Out	

5) TTL input

Connector	Pin No.	Signal	
D – Sub 9P	1	GND	
	2	Secondary Red	TTL
	3	Primary Red	TTL
	4	Primary Green	TTL
	5	Primary Blue	TTL
	6	Secondary Green / Intensity	TTL
	7	Secondary Blue	TTL
	8	H – Sync.	TTL – Posi / Nega.
	9	V – Sync.	TTL – Posi / Nega.

6) Audio input

Connector	Pin No.	Signal	
RCA Pin	—	Video – 1 (R, L)	0.4Vrms, 47KΩ
〃	—	Video – 2 (R, L)	〃
〃	—	Analog – 1 (R, L)	〃
〃	—	Analog – 2 (R, L)	〃
〃	—	TTL (R, L)	〃

7) Audio Output

Connector	Pin No.	Signal	
RCA Pin	—	Line out (R, L)	0.4Vrms, 47KΩ
〃	—	Controlled out (R, L)	〃

8) External Control

Connector	Pin No.	Signal	
D-Sub 9P	1	Video-1 Select	TTL Low
	2	Video-2 Select	TTL Low
	3	Analog-1 Select	TTL Low
	4	Analog-2 Select	TTL Low
	5	TTL Select	TTL Low
	6	Mode (Mode 1/2)	TTL High - Mode 1 Low - Mode 2
	7	Control Method (Remote-Cont/) External-Cont.)	TTL High - Remo-Cont Mode Low - External Cont Mode
	8	Power on/off	TTL Low - Power on
	9	GND	
		Manual Degauss	Pin 8 Low and Pin 7 High

7. ENVIRONMENTAL CONDITIONS

7.1 Temperature

1) Operating	: 5 °C ~ 40° C
2) Storage	: – 10 °C ~ 55 °C

7.2 Relative Humidity

Operating	: 10% ~ 95% (Not condensed)

7.3 Altitude	: Sea level to 2133.6 m (at 25 °C)

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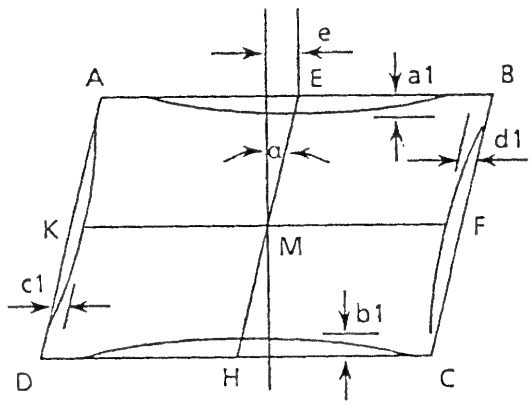
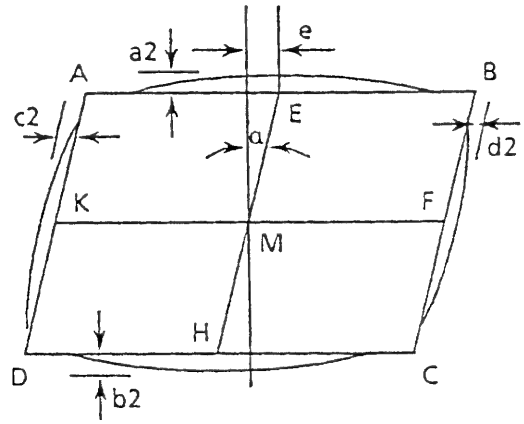
* GEOMETRIC DISTORTION





· TRAPEZOID DISTORTION

HORIZONTAL : $\frac{AD-BC}{AD+BC} \times 100$ (%)

VERTICAL : $\frac{AB-DC}{AB+DC} \times 100$ (%)

· PINCUSHION DISTORTION

TOP : $4\frac{a1}{AD+BC} \times 100$ (%)

BOTTOM : $4\frac{b1}{AD+BC} \times 100$ (%)

LEFT : $4\frac{c1}{AB+DC} \times 100$ (%)

RIGHT : $4\frac{d1}{AB+DC} \times 100$ (%)

TITLE	8. RASTER DISTORTION	

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· BARREL DISTORTION

TOP : $4 \frac{a2}{AD+BC} \times 100$ (%)

BOTTOM : $4 \frac{b2}{AD+BC} \times 100$ (%)

LEFT : $4 \frac{c2}{AB+DC} \times 100$ (%)

RIGHT : $4 \frac{d2}{AB+DC} \times 100$ (%)

· PARALLELOGRAM DISTORTION : $\alpha \leqq 1°$

TITLE	8. RASTER DISTORTION	

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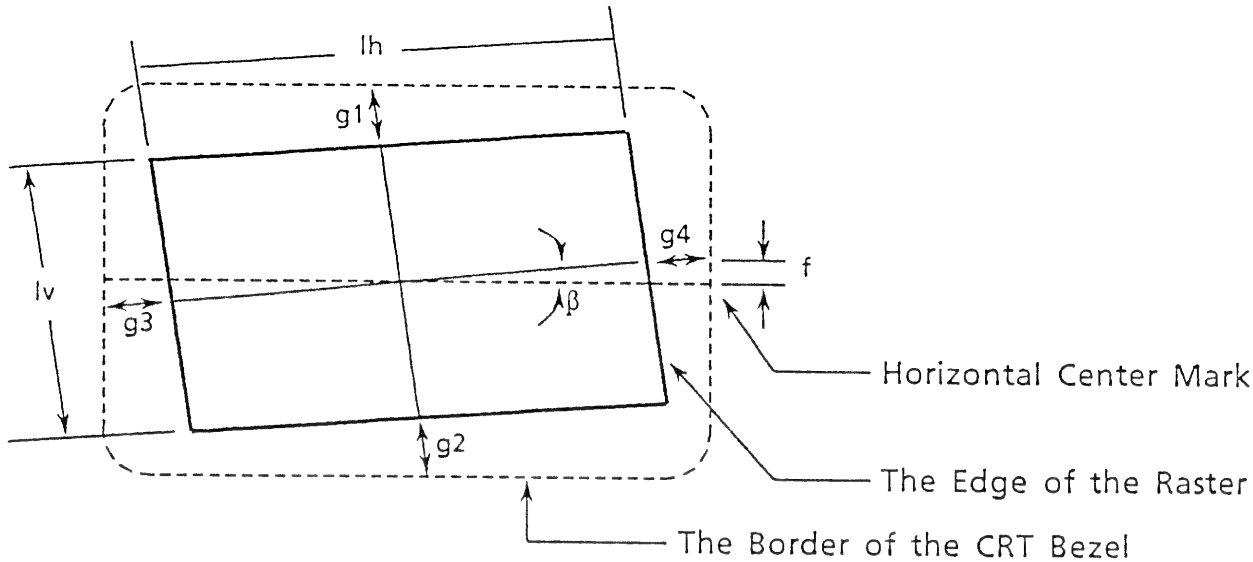

· CENTERING

HORIZONTAL : $|g3 - g4|$
To be adjustable to center by Horiz. Centering VR

VERTICAL : $|g1 - g2|$

· ROTATION : $\beta \leqq \pm 1°$

Including the condition of rotating the monitor through 360 degrees on a non – metalic surface.

TITLE 8. RASTER DISTORTION

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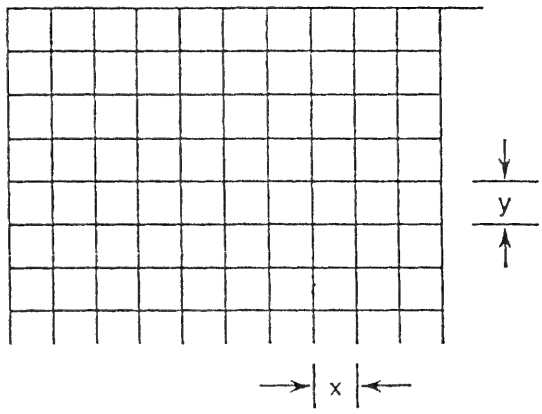
NONLINEARITY

Scanning nonlinearity is defined in terms of the pattern of horizontal (more than 16 lines) and vertical (more than 12 lines) lines produced by the cross-hatch pattern generator.

ex)



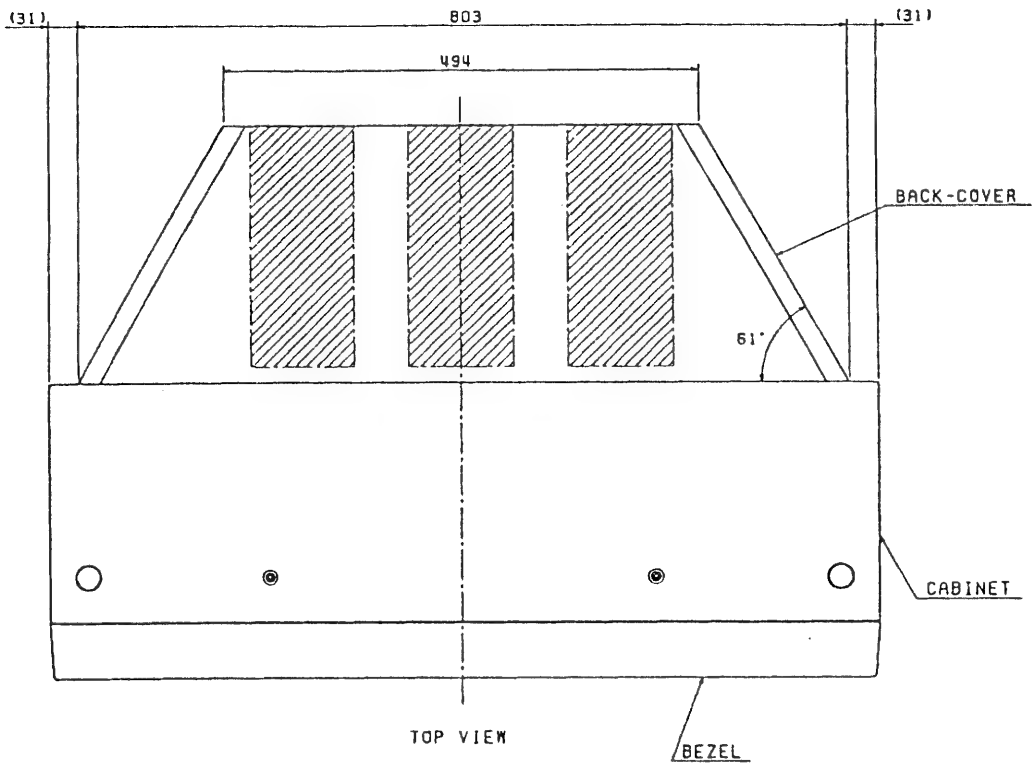
Horizontal nonlinearity

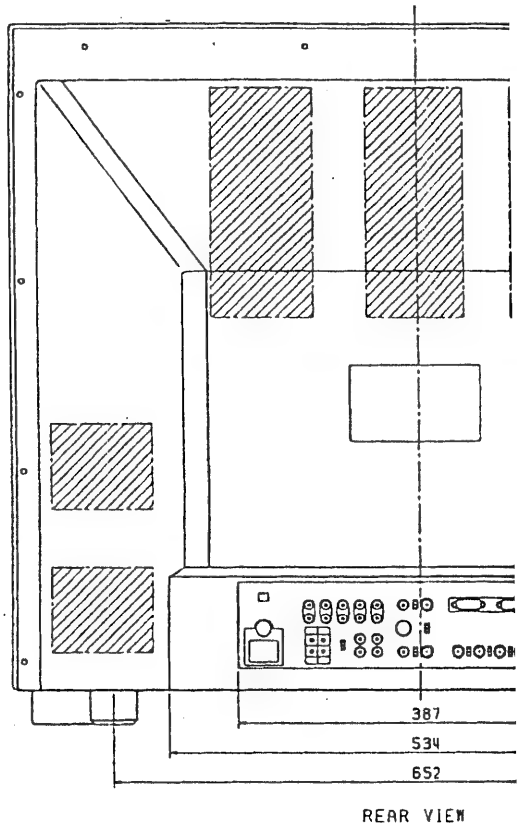
$$\frac{(Xmax - Xmin) / 2}{\overline{X}} \times 100 \quad (\%)$$

Vertical nonlinearity

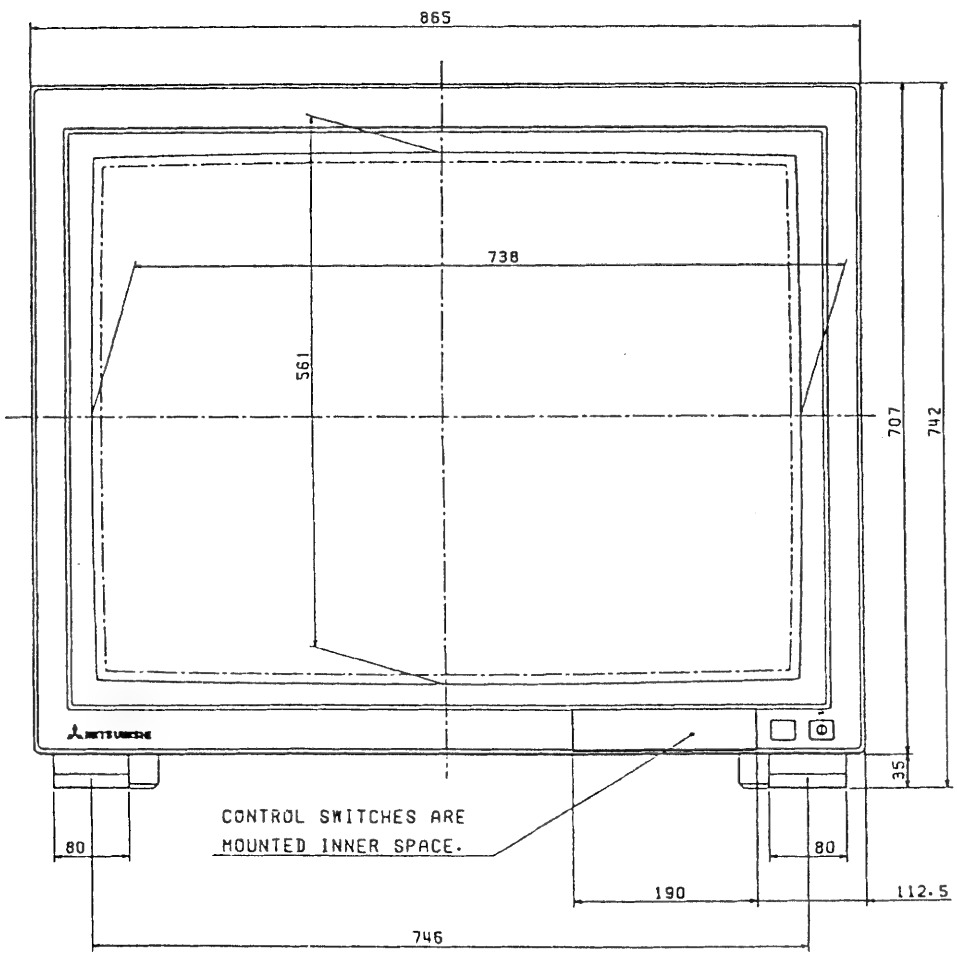
$$\frac{(Ymax - Ymin) / 2}{\overline{Y}} \times 100 \quad (\%)$$

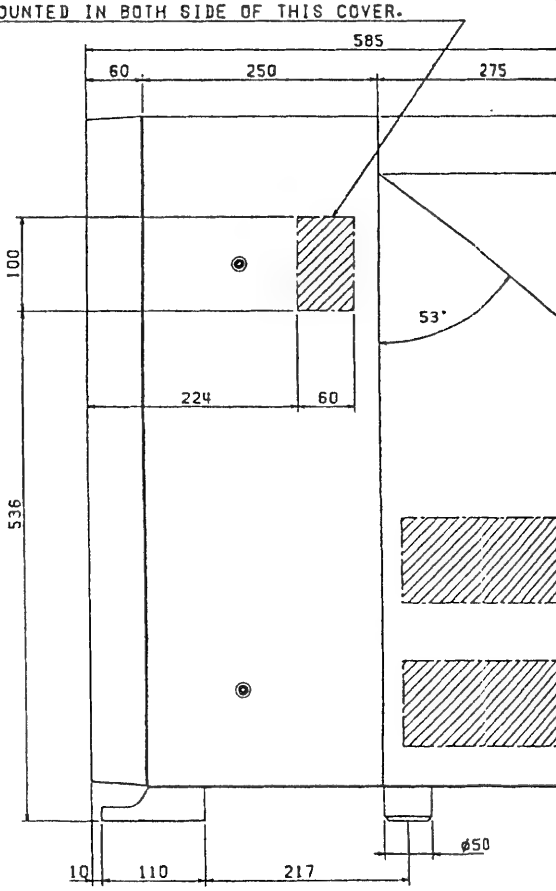
TITLE	8. RASTER DISTORTION	





SPEAKERS ARE MOUNTED IN BOTH SIDE OF THIS COVER.





NOTICE

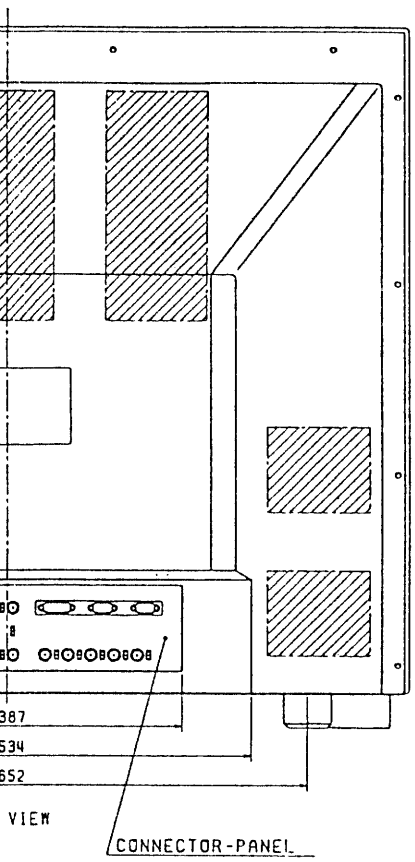
COLOR : BEZEL--------GRAY EXCEPT FOR THE HATCHED SPACE
HATCHED SPACE IS BLACK.

SIDE-COVER---IVORY WHITE

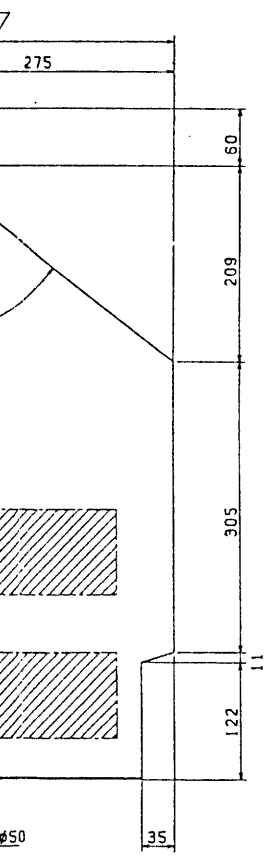
BACK-COVER---IVORY WHITE

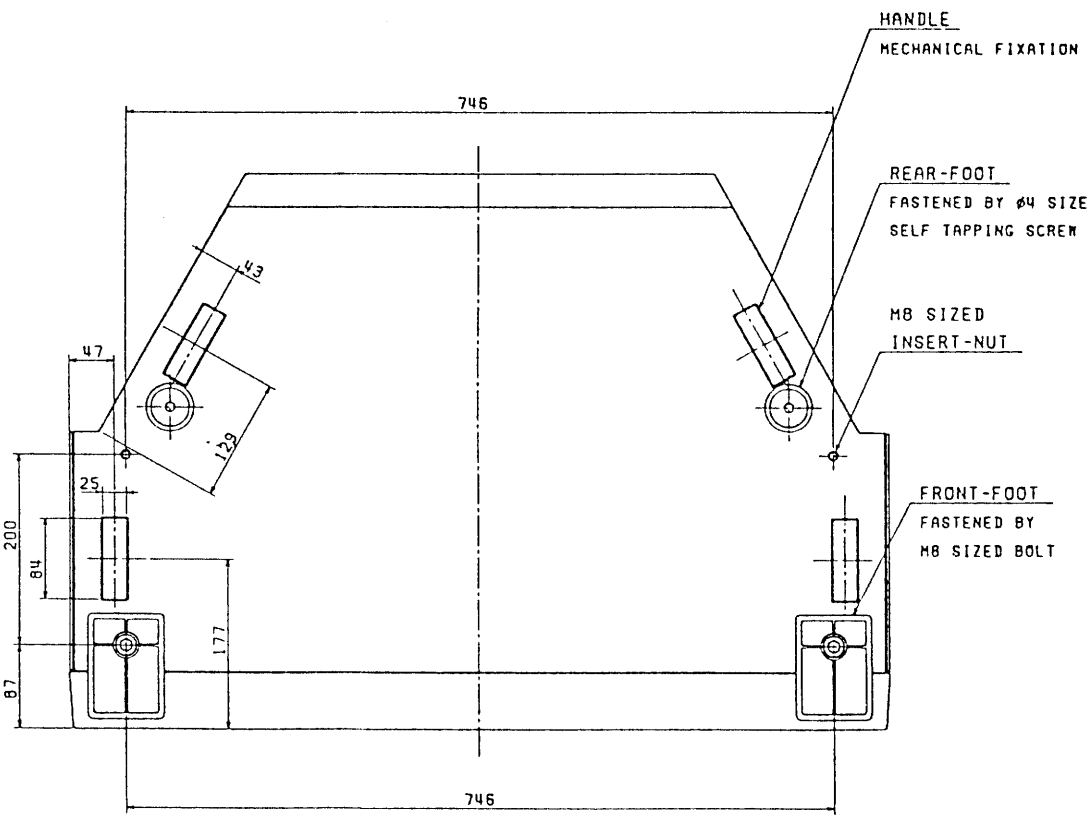
CONNECTOR-PANEL---WHITE

WEIGHT : APPROX 100 KG



VIEW





BOTTOM VIEW

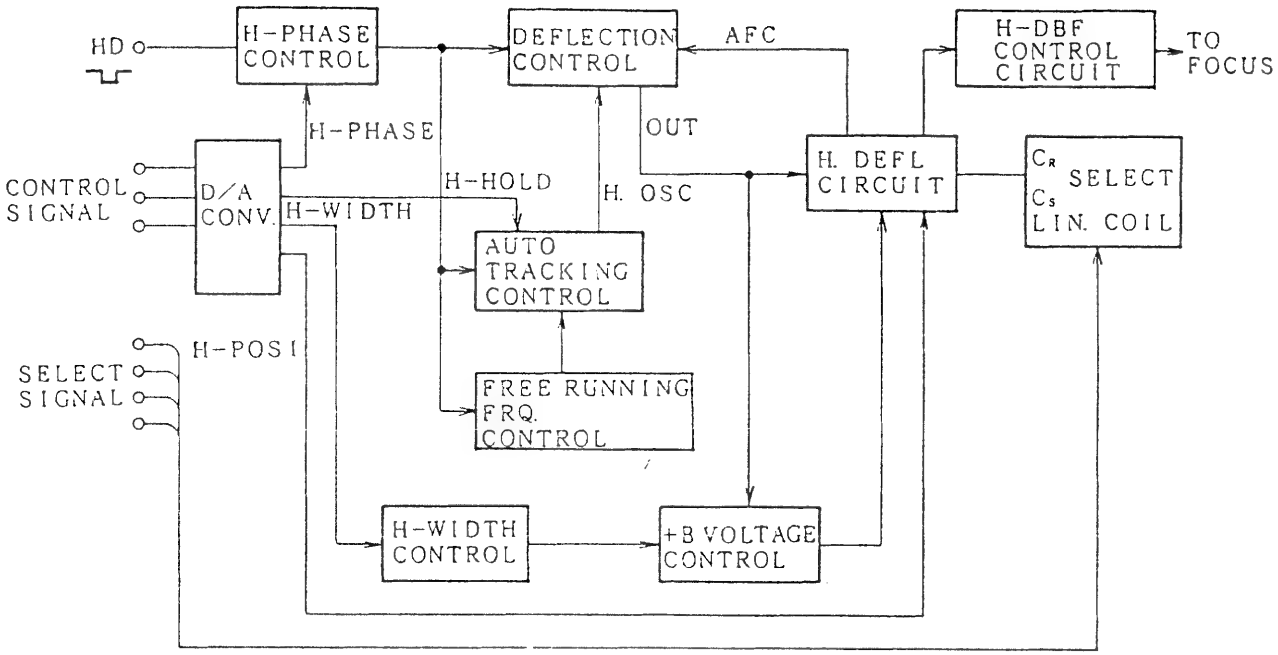
		G05	CAD
MITSUBISHI ELECTRIC CORPORATION NAGASAKI WORKS		OUTLINE (XC-3715C)	
DRAWN M.KAMAI	APPROVED	CP987A009	PAGE
CHECKED K.ISHIBASHI			
DESIGNED M.KAMAI			

1/4 SCALE | 89-1-24 DRAWN DATE | THIRD ANGLE PROJECTION

§ 2. CIRCUIT DESCRIPTION

1. HORIZONTAL DEFLECTION CIRCUIT

THE HORIZONTAL DEFLECTION CIRCUIT IS CONSISTED BY FOLLOWING BLOCK.



BLOCK DIAGRAM OF HORIZONTAL DEFLECTION CIRCUIT

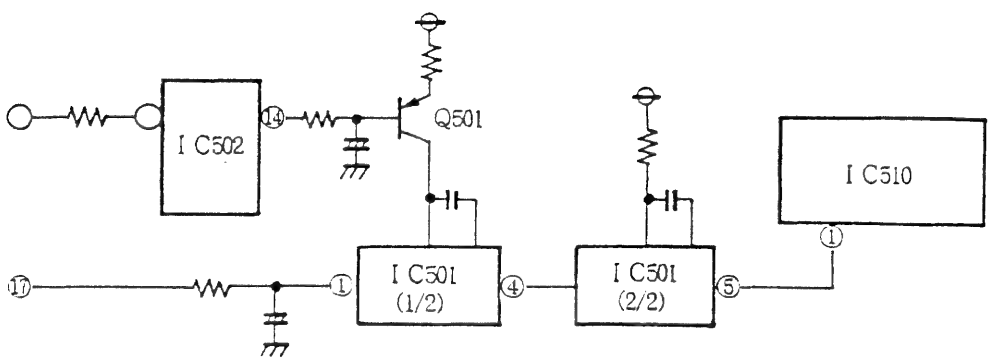
1-1 HORIZONTAL PHASE CONTROL

(1) OPERATION

THE HORIZONTAL PHASE CONTROL CIRCUIT IS CONSISTED BY IC501 AND IC510.

THE HORIZONTAL SYNC PULSE OF NEGATIVE GOING FROM VIDEO CIRCUIT IS APPLIED TO THE ONE SHOT MULTI VIBRATOR OF IC501, WHICH MAKES DELAYED PULSE AND CAN CONTROLL THE OUTPUT PULSE DUTY BY BASE VOLTAGE OF Q501, SO THAT THEY CAN CONTROLL THE HORIZONTAL PHASE OF RASTER.

(2) CIRCUIT



1-2 HORIZONTAL AUTO-TRACKING CONTROL

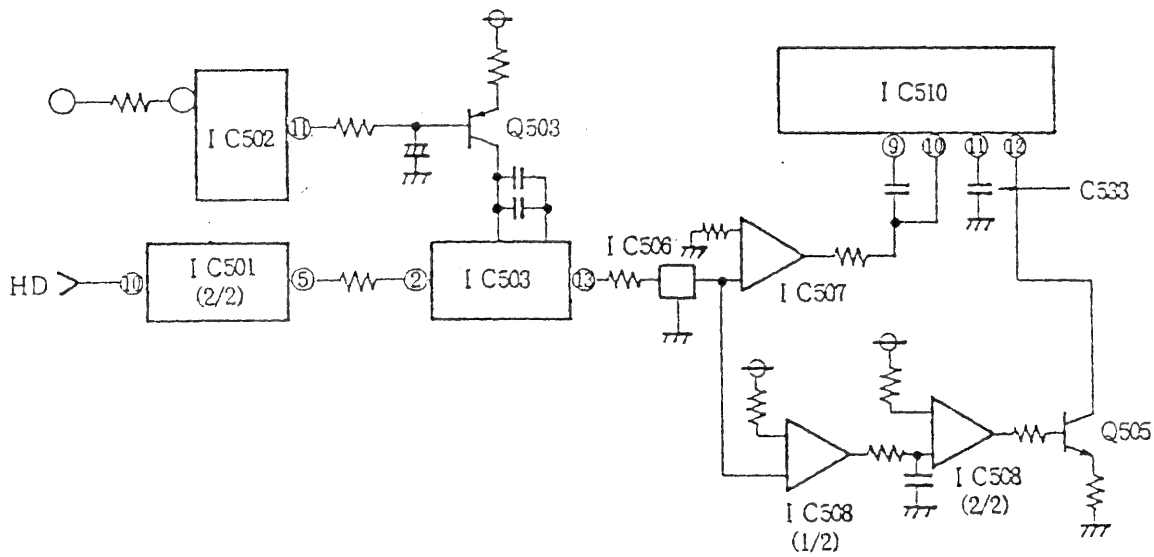
(1) OPERATION

THE HORIZONTAL AUTO-TRACKING CIRCUIT IS CONSISTED BY IC503(1/2), IC506, IC507, IC510, Q505, IC508(1/2, 2/2) AND PERIPHERAL CIRCUITS, WHICH TO CONTROLL THE CHARGE OR DISCHARGE CURRENT OF C533 THROUGH IC510.

THE HORIZONTAL SYNC. SIGNAL FROM HORIZONTAL PHASE CIRCUIT IS APPLIED TO THE ONE SHOT MULTI VIBRATOR OF IC 503(1/2), THEN OUTPUT PULSE DUTY OF IC503(1/2) IS CONTROLLED BY CHARGE CURRENT OF C518 AND C519 VIA Q503. (BASE OF Q503 IS CONTROLLED BY IC502)

THIS OUTPUT PULSE IS RECTIFIED BY INTEGRATION CIRCUIT OF R535 AND C523 THROUGH IC508(1/2), WHICH IS APPLIED TO THE BASE OF Q505 SO THAT BASE VOLTAGE OF Q505 IS IN PRUPORTION TO THE HORIZONTAL FREQUENCY, THEN IT CONTROLL THE CHARGE OR DISCHARGE CURRENT OF C533 VIA IC510. THESE OPERATION CAN PERFORM THE AUTO-TRACKING FUNCTION.

(2) CIRCUIT



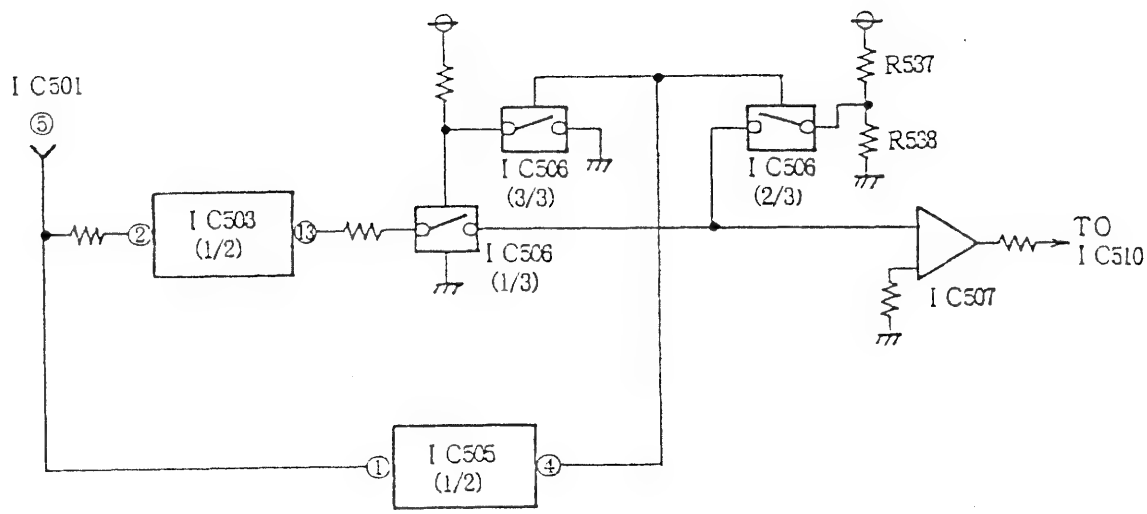
1-3 FREE RUNNING FREQUENCY CONTROL

(1) OPERATION

FREE RUNNNING FREQUENCY MEANS INTERNAL OSCILLATION FREQUENCY, WHEN DISCONNECT THE SYNC. SIGNAL, WHICH IS FIXED BY IC505 AND IC506. IN NORMALLY, H-LIM SIGNAL OF ① PIN IN CONNECTOR "CD-1" IS FIXED TO HIGH LEVEL, WHEN INPUT THE SYNC. SIGNAL. HOWEVER, WHEN DISCONNECT THE SYNC. SIGNAL(NO SIGNAL CONDITION), ⑤ PIN OF IC501 IS FIXED TO HIGH LEVEL, SO THAT OUTPUT TERMINAL OF ④ PIN OF IC505 IS FIXED TO HIGH LEVEL, THEN 2/3 AND 3/3 OF IC506 BECOMES ON, 1/3 BECOMES OFF CONDITION.

AS THE RESULT OF THIS OPERATION, SYNC. PULSE FROM IC503 IS COMPLETELY STOPPED BY ANALOG SWITCH OF IC506(1/3) THEN VOLTAGE OF ② PIN OF IC506(1/3) IS FIXED BY R537 AND R538 WHICH TO OBTAIN THE CONSTANT FREE RUNNING FREQUENCY. (APPROX. 26 TO 27 KHz)

(2) CIRCUIT



1-4 +B VOLTAGE AND HORIZONTAL WIDTH CONTROL

(1) OPERATION

THE HORIZONTAL RASTER SIZE IS DETERMINED BY POWER SUPPLY VOLTAGE OF HORIZONTAL DEFLECTION CIRCUIT(+B VOLTAGE), WHICH IS CONTROLLED BY IC222 OF MPU ACCORDING TO THE INPUT SYNC. SIGNAL, TO OBTAIN THE CONSTANT HORIZONTAL RASTER.

THE OUTPUT PULSE FROM IC510 OF HORIZONTAL DEFLECTION CONTROL IS APPLIED TO THE GATE OF Q523 OF THE CHOPPER FET THROUGH IC503(2/2), Q539 AND Q521.

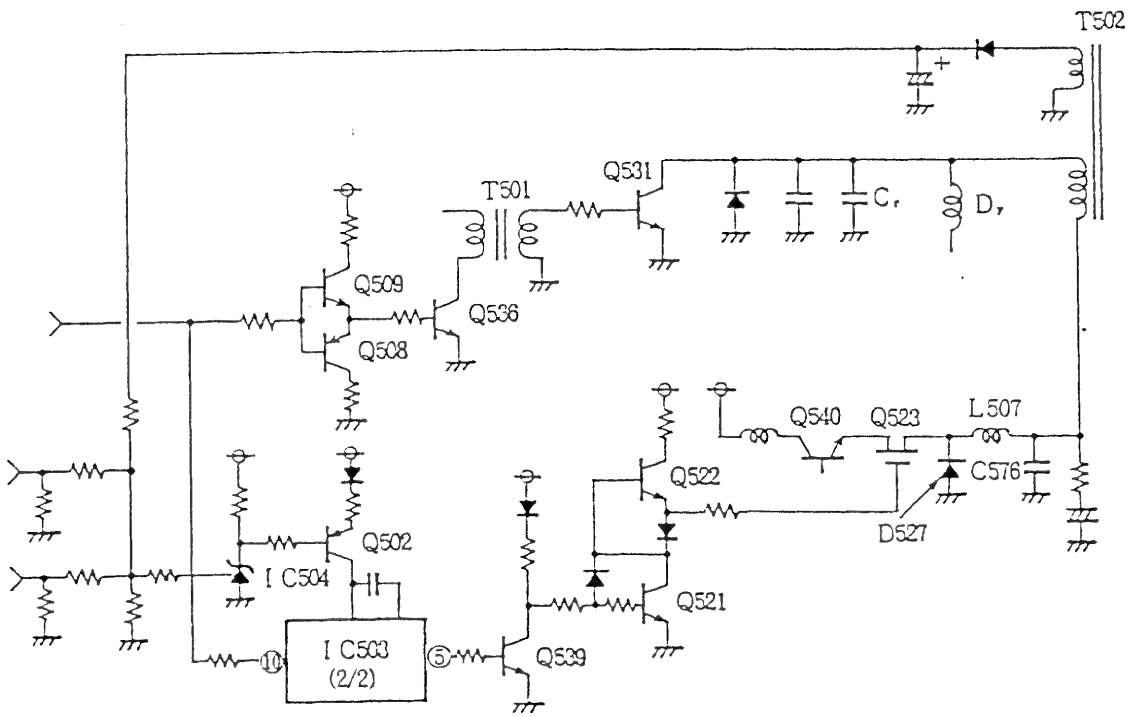
THIS PULSE MAY CHOP 150V LINE FROM POWER SUPPLY CIRCUIT BY Q523, WHICH VOLTAGE IS RECTIFIED BY D527, L507 AND C576, THEN IT IS SUPPLIED TO THE POWER SUPPLY LINE OF HORIZONTAL DEFLECTION CIRCUIT THROUGH T502.

THE OUTPUT PULSE RATIO OF IC503 IS CONTROLLED BY IC222 VIA IC502, IC504 AND Q502.

THE OUTPUT SIGNAL OF IC502(⑫, ⑬ PIN) IS COMPARED WITH REFERENCE VOLTAGE OF IC504, WHICH IS APPLIED TO CONTROLL THE BASE VOLTAGE OF Q502, SO THAT THEY CAN CONTROLL THE OUTPUT PULSE DUTY RATIO OF IC503, THEN IT CONTROLL THE CHOPPING PERIOD OF Q523 ACCORDING TO THE INPUT SIGNAL.

THESE OPERATION CAN CONTROLL THE POWER SUPPLY VOLTAGE OF HORIZONTAL DEFLECTION CIRCUIT, TO OBTAIN THE CONSTANT RASTER SIZE.

(2) CIRCUIT

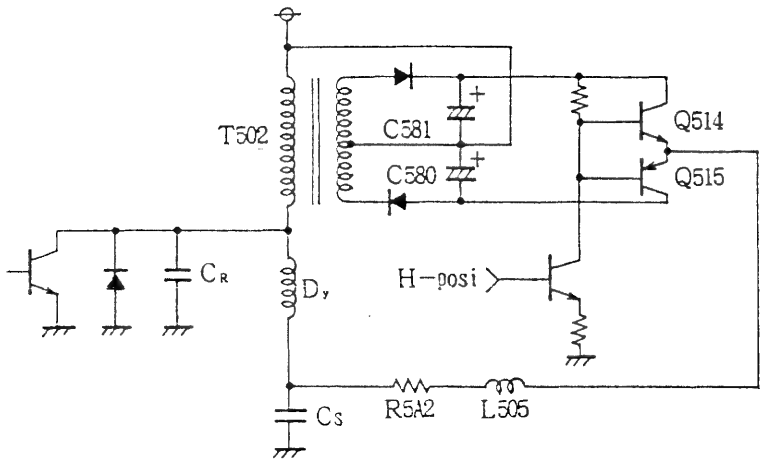


1-5 HORIZONTAL POSITION CONTROL

(1) OPERATION

HORIZONTAL RASTER POSITION IS CONTROLLED THAT THE BIAS DC CURRENT TO HORIZONTAL DEFLECTION COIL, WHICH IS SUPPLIED FROM Q514, Q515 ⟷ R5A2 ⟷ L505 ⟷ DY ⟷ C580, C581.

(2) CIRCUIT



1-6 C_S, LINEARITY COIL AND C_R SELECTION

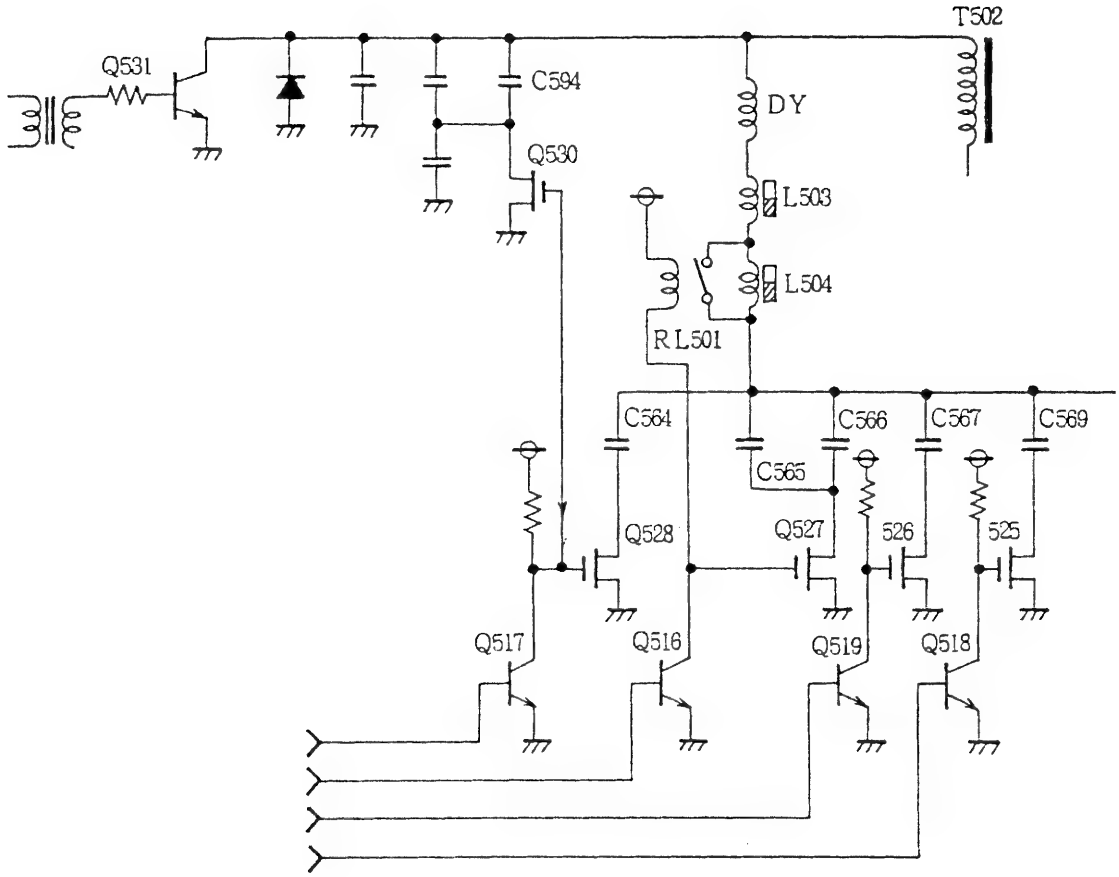
(1) OPERATION

IN THE AUTO-TRACKING FUNCTION, IT HAS THE LINEARITY CONTROL CIRCUIT WHICH COMPENSATE TO OBTAIN THE OPTIMUM LINEARITY IN WIDE FREQUENCY RANGE.

THE LINEARITY CONTROL CIRCUIT CAN SELECT 5 DIFFERENT CAPACITORS(C564~567, C569) ACCORDING TO THE INPUT SYNC. SIGNAL BY SELECTION TRANSISTOR Q516~519. AND IT ALSO SELECT 2 DIFFERENT COILS(L503, L504) ACCORDING TO THE INPUT SYNC. SIGNAL BY Q516 AND RL501.

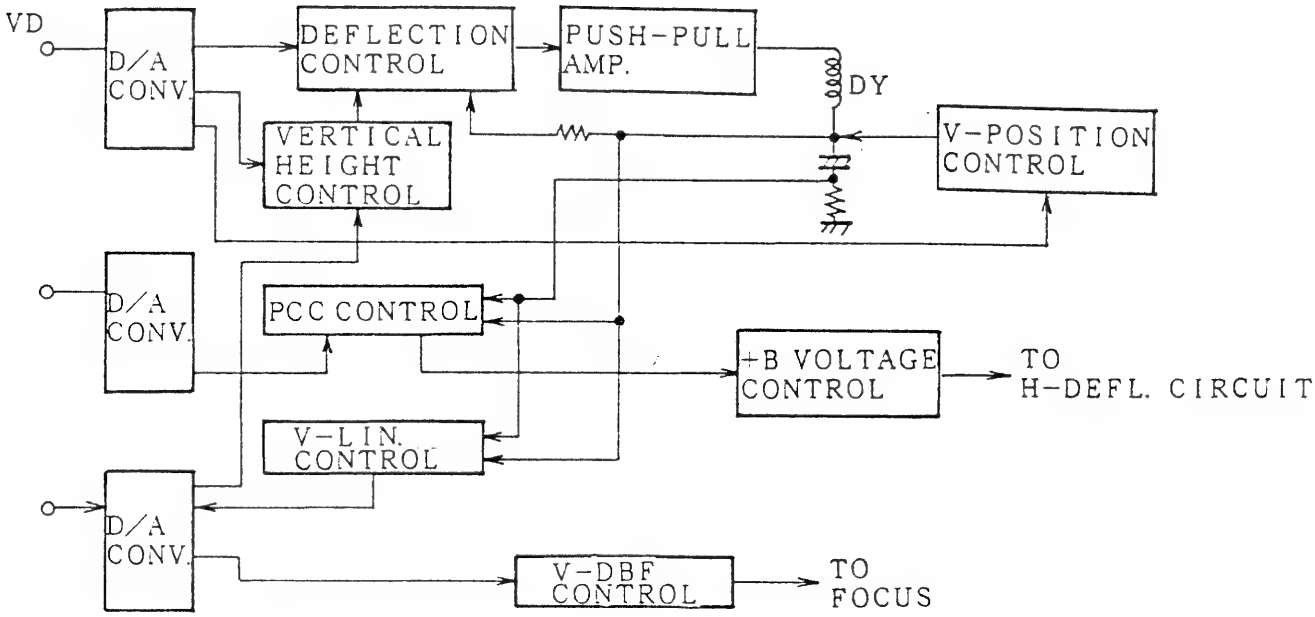
THE RESONANCE CAPACITOR(C_R) OF C594 IS SELECTED BY Q517 TOO, WHICH TO REDUCE THE COLLECTOR PULSE OF HORIZONTAL OUTPUT TRANSISTOR Q536 AT OVER SCANNING CONDITION OF LOWER FREQUENCY.

(2) CIRCUIT


T502
Q531
C594
DY
Q530
L503
L504
RL501
C564
C566
C567
C569
C565
Q528
Q527
526
525
Q517
Q516
Q519
Q518

2. VERTICAL DEFLECTION CIRCUIT

THE VERTICAL DEFLECTION CIRCUIT IS CONSISTED BY FOLLOWING BLOCK.



BLOCK DIAGRAM OF VERTICAL DEFLECTION CIRCUIT

2-1 VERTICAL AUTO-TRACKING CONTROL

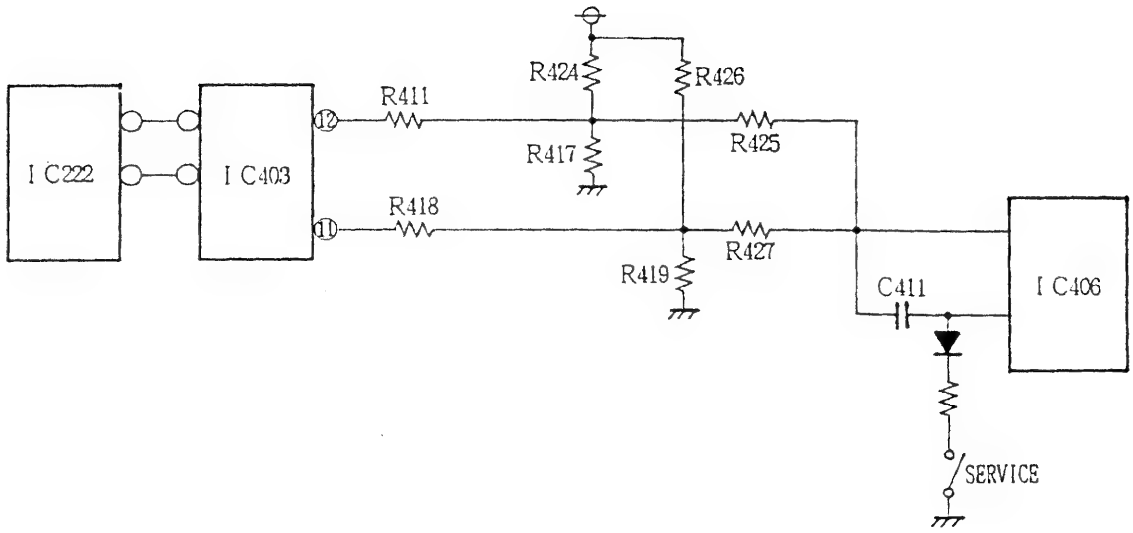
(1) OPERATION

THE VERTICAL AUTO-TRACKING CIRCUIT IS BASICALLY SAME AS HORIZONTAL CIRCUIT, IT IS CONTROLLED BY CHARGE OR DISCHARGE CURRENT OF C411 VIA IC401, WHICH TO CONTROLL THE VERTICAL FREE RUNNING FREQUENCY ACCORDING TO THE INPUT SYNC. SIGNAL.

THE VERTICAL SYNC. INPUT SIGNAL IS CONVERTED TO VOLTAGE FROM FREQUENCY BY IC222 IN VIDEO CIRCUIT, WHICH VOLTAGE IS APPLIED TO IC403 OF D/A CONVERTOR. THE OUTPUT OF IC403 IS APPLIED TO C411 THROUGH R418 AND R417 WHICH CAN CONTROLL THE VERTICAL FREE RUNNING FREQUENCY.

ALSO, THE VERTICAL HOLD IS CONTROLLED BY OUTPUT SIGNAL OF IC403, WHICH IS APPLIED TO C411 THROUGH R411 AND R425.

(2) CIRCUIT



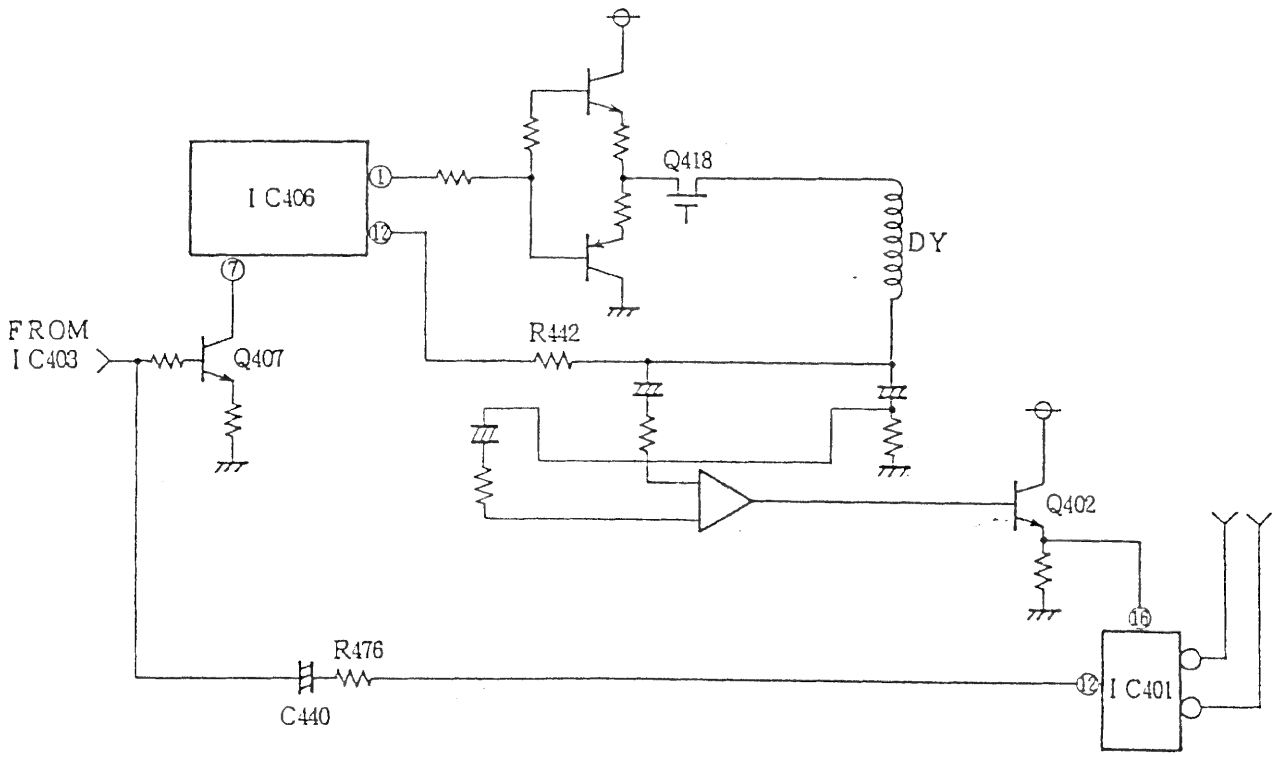
2-2 VERTICAL HEIGHT CONTROL

(1) OPERATION

THE VERTICAL RASTER SIZE IS DETERMINED BY CURRENT OF ⑦ PIN ON IC406, WHICH IS CONTROLLED BY OUTPUT OF IC403 VIA Q407, AND THEY OBTAIN CONSTANT VERTICAL RASTER SIZE IN WIDE FREQUENCY RANGE.

THE VERTICAL RASTER SIZE IS CONTROLLED BY OUTPUT VOLTAGE OF IC403, WHICH TO CONTROLL THE BASE VOLTAGE OF Q407, SO THAT IT WILL BE CHANGED TO CONTROLL THE CURRENT OF ⑦ PIN ON IC406.

(2) CIRCUIT



2-3 VERTICAL LINEARITY CONTROL

THE BASE OF Q407 IS MODULATED BY PARABOLIC WAVE FROM VERTICAL DEFLECTION CIRCUIT, WHICH TO IMPROVE THE VERTICAL LINEARITY ON SCREEN IN WIDE FREQUENCY RANGE.

THIS PARABOLIC WAVE IS CONTROLLED TO SMALL AMPLITUDE WHEN INPUT THE LOWER FREQUENCY SIGNAL, AND IT IS CONTROLLED TO BIG AMPLITUDE WHEN INPUT THE HIGHER FREQUENCY SIGNAL BY MPU OF IC222.

THEY ARE APPLIED TO THE BASE OF Q407 THROUGH THE POWER SUPPLY LINE OF IC401 (⑩ PIN).

2-4 PCC CONTROL

(1) OPERATION

PCC(Side Pin Cushion Control) CIRCUIT MAY COMPENSATE FOR THE SIDE DISTORTION ON SCREEN, WHICH CAN CORRECT THE HORIZONTAL WIDTH BY MODULATION OF PARABOLIC WAVE OF VERTICAL PERIOD.

THE AMPLITUDE OF PARABOLIC WAVE CAN COMPENSATE THE PIN CUSHION OR BARREL DISTORTION, AND PHASE OF PARABOLIC WAVE CAN COMPENSATE THE TRAPEZOIDAL DISTORTION.

THE PARABOLIC WAVE FROM C414 IS AMPLIFIED BY IC407, IC405 AND IC402(1/2), THEN IT MODULATE THE POWER SUPPLY OF IC401 THROUGH Q402.

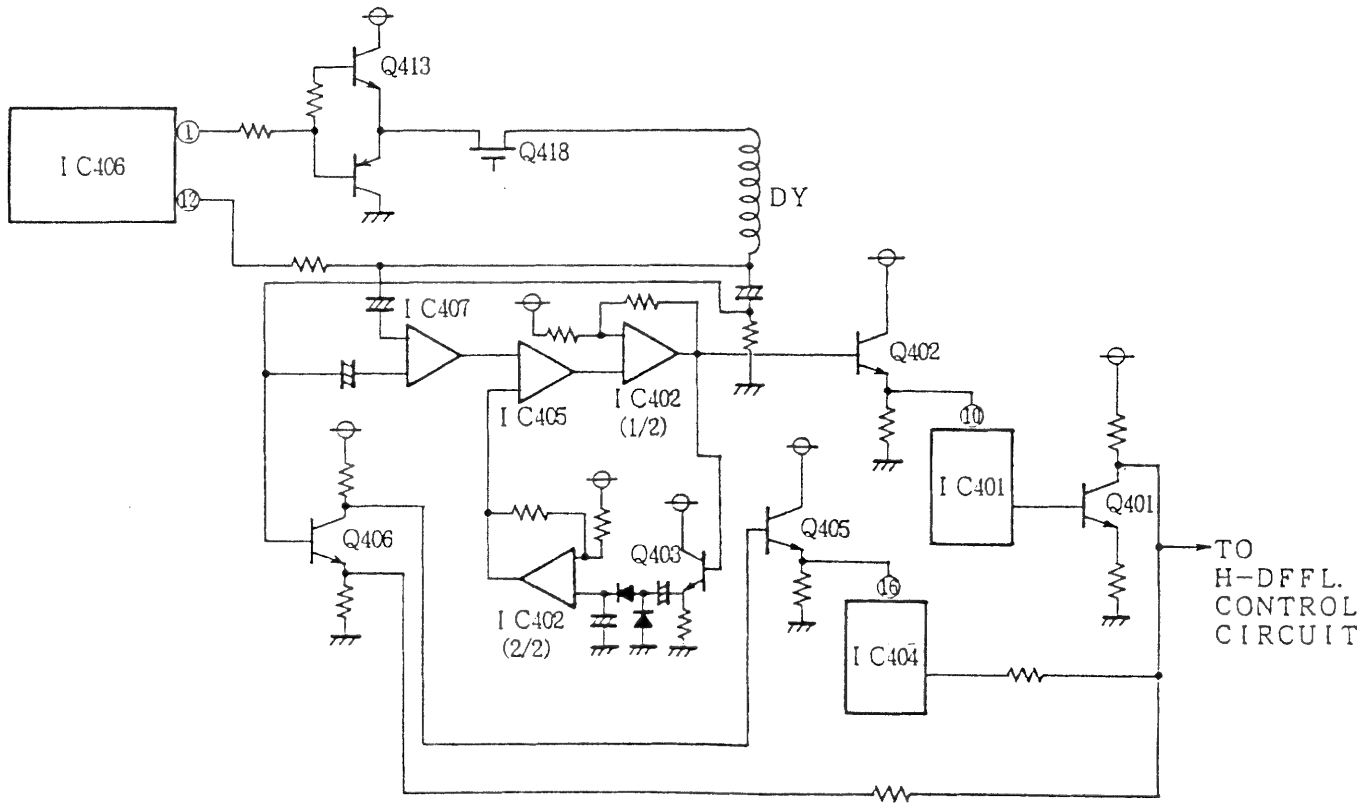
THIS PARABOLIC WAVE IS CONTROLLED TO OBTAIN THE CONSTANT WAVE FORM IN WIDE FREQUENCY RANGE, BY Q403 AND IC402(2/2) IN FEEDBACK CIRCUIT.

ON THE OTHER HAND, THE SAWTOOTH WAVE FROM R434 IS APPLIED TO Q406, THEN IT PROVIDES IN-PHASE WAVE FROM EMITTER AND IT ALSO PROVIDES THE INVERTED WAVE FROM COLLECTOR.

THE INVERTED WAVE MODULATE THE POWER SUPPLY OF IC401 THROUGH Q402.

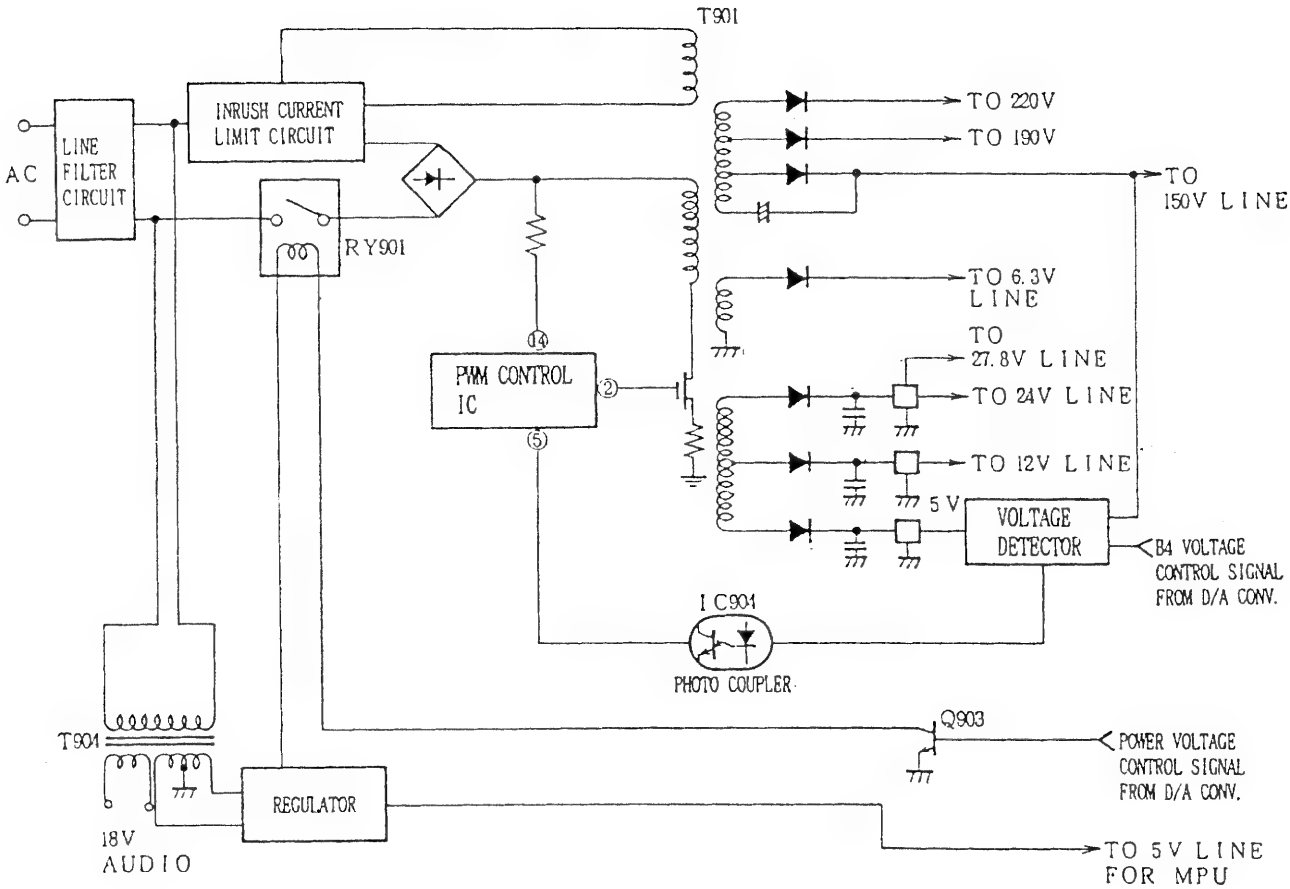
THESE WAVES ARE COMBINED AND APPLIED TO IC503 FOR COMPENSATION OF SIDE DISTORTION.

(2) CIRCUIT



3. POWER SUPPLY CIRCUIT

THE POWER SUPPLY CIRCUIT IS CONSISTED BY FOLLOWING BLOCK.



BLOCK DIAGRAM OF POWER SUPPLY CIRCUIT

3-1 FEATURES

(1) POWER SUPPLY CIRCUIT CAN SELECT AC100V~120V OR AC200V~240V INPUT VOLTAGE BY SELECTION SWITCH ON THE REAR PANEL.

(2) THERE ARE TWO KINDS OF SWITCH IN POWER SUPPLY CIRCUIT, ONE IS USED FOR MECHANICAL SWITCH(MAIN SWITCH) AND ANOTHER IS REMOTE CONTROL SWITCH (SUB SWITCH).

(3) POWER SUPPLY CIRCUIT HAS THE SWITCHING REGULATOR OF FLYBACK TYPE WHICH IS OPERATED AS PWM(Pulse Width Modulation) METHOD TO CONTROLL THE OUTPUT VOLTAGE. THE OSCILLATION FREQUENCY IS APPROXIMATELY 80KHz.

(4) THE POWER SUPPLY VOLTAGE IS SUPPLIED TO FOLLOWING LOAD.

OUTPUT VOLTAGE	MAIN LOAD
220	VIDEO CUT-OFF
190	VIDEO POWER SUPPLY
150	HIGH VOLTAGE, HORIZONTAL DEFLECTION
27	VERTICAL DEFLECTION
24	HIGH VOLTAGE, VERTICAL DEFLECTION
12	DEFLECTION, VIDEO
5	DEFLECTION, VIDEO
6.3	CRT HEATER

(5) THE SUB POWER SUPPLY CIRCUIT IS CONSISTED BY LOW FREQUENCY TRANSFORMER OF T904 WHICH IS SUPPLIED TO FOLLOWING LOAD.

OUTPUT VOLTAGE	MAIN LOAD
5V	MPU POWER SUPPLY
18V	AUDIO POWER SUPPLY

(6) THE FOLLOWING CIRCUITS ARE CONTROLLED BY OUTPUT SIGNAL FROM MPU(IC222).

B4 VOLTAGE, HIGH VOLTAGE, AUTO DEGAUSS, MANUAL DEGAUSS

3-2 PRIMARY RECTIFYING AND SMOOTHING CIRCUIT

(1) THIS MONITOR IS AVAILABLE FOR WORLD WIDE POWER INLET, WHICH WILL BE SELECTABLE BY SELECTION SWITCH ON REAR PANEL WHEN INPUT AC120V OR 240V.

(2) AC INLET IS RECTIFIED BY D901 OF DIODE BRIDGE, THEN IT IS SMOOTHED BY C912, C913, AND TO CONVERT DC VOLTAGE.

(3) THE RECTIFIER CIRCUIT MAY OPERATE FOR DOUBLE VOLTAGE RECTIFYING WHEN INPUT AC100V TO 120V, AND FULL WAVE RECTIFYING WHEN INPUT AC200V TO 240V, WHICH IS SELECTED BY SELECTION SWITCH ON REAR PANEL.

(4) INRUSH CURRENT AT TURN ON THE MONITOR IS SUPPRESSED BY THERMISTOR OF TH901 AND TH902 IN RECTIFYING CIRCUIT.
THESE THERMISTORS ARE SHORTED BY TRIAC OF IC902 AFTER STARTING THE OSCILLATION OF PRIMARY SWITCHING REGULATOR OF IC905.

3-3 DEGAUSSING CIRCUIT

THERE ARE TWO KINDS OF DEGAUSSING CIRCUIT IN MONITOR.
ONE IS THE AUTORMATIC DEGAUSS CIRCUIT, WHICH IS AUTOMATICALLY OPERATED THE DEGAUSSING FUNCTION AT TURN ON THE MAIN SWITCH; THEN DEGAUSSING CURRENT GO THROUGH RP902 WHEN INPUT AC100V TO 120V, AND GO THROUGH RP901 AND R901 WHEN INPUT AC200V TO 240V.
ANOTHER ONE IS MANUAL GEGAUSS CIRCUIT, WHICH IS OPERATED AT TURN ON THE DEGAUSSING SWITCH.
IT IS SAME OPERATION AS THE AUTOMATIC DEGAUSS CIRCUIT, AND IT NECESSARY FOR THE COOLING TIME OF POSISTOR ABOUT 10 MINUTES AT USING THE MANUAL DEGAUSS SWITCH.

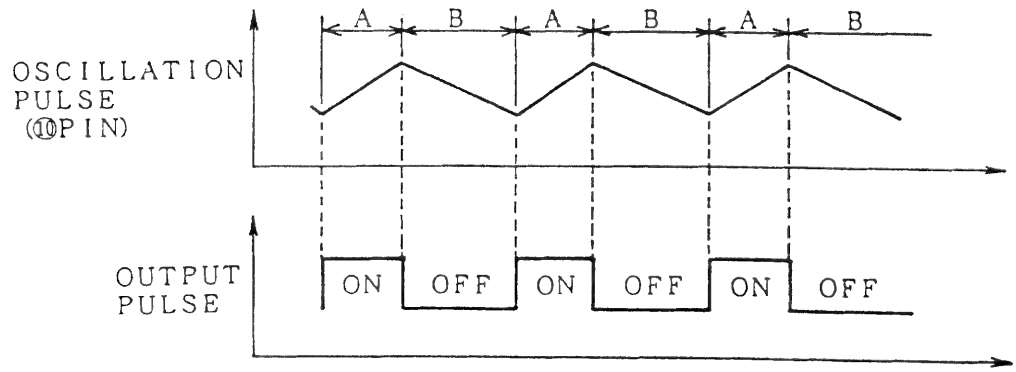
3-4 SWITCHING REGULATOR CIRCUIT

1) PRIMARY CIRCUIT

(1) WHEN TURN ON THE POWER SWITCH, RECTIFIED DC VOLTAGE FROM C912 AND C913 IS FED TO ⑭ PIN OF IC905 THROUGH R912 AND R913.
WHEN THE POWER SUPPLY VOLTAGE OF IC905 REACHES TO OVER 16V, IC905 WILL BEGIN TO START THE OSCILLATION, THEN IT INDUCE THE VOLTAGE ON ⑥ PIN OF T901 WHICH IS RECTIFIED BY D906 AND C917, SO THAT THIS INDUCED VOLTAGE IS FED TO IC905.

(2) THE OUTPUT VOLTAGE ON ⑫ PIN(150V) OF T901 IS FED BACK TO ⑤ PIN OF IC905 VIA PHOTO COUPLER OF IC904 AND PROGRAMABLE SHUNT REGULATOR OF IC915.
WHEN THE ⑫ PIN OF T901 REACHES TO OVER 150V, CATHODE CURRENT OF IC915 IS INCREASING, THEN INFLOW CURRENT OF PHOTO DIODE OF IC904 IS INCREASING TOO.
AT THIS TIME, COLLECTOR CURRENT OF PHOTO TRANSISTOR OF IC904 IN PRIMARY SIDE IS INCREASING, SO THAT THE OUTPUT PULSE DUTY RATIO OF IC905 IS CONTROLLED TO OBTAIN THE CONSTANT VOLTAGE OF 150V POWER SUPPLY LINE.

(3) IC905 OSCILLATES IN APPROX. 80KHz, WHICH PROVIDES THE DRIVE PULSE ON ② PIN, THEN IT IS APPLIED TO THE GATE OF Q901 AND Q902.
THE OSCILLATION PULSE IS SHOWN AS BELOW.
"A" PERIODE IN WAVE IS DETERMINED BY R920 AND C919, WHICH IS OPERATED TO TURN ON THE REGULATOR.
"B" PERIODE IN WAVE IS DETERMINED BY R919 AND C919, WHICH IS OPERATED TO TURN OFF THE REGULATOR.



OSCILLATION OF SWITCHING POLSE

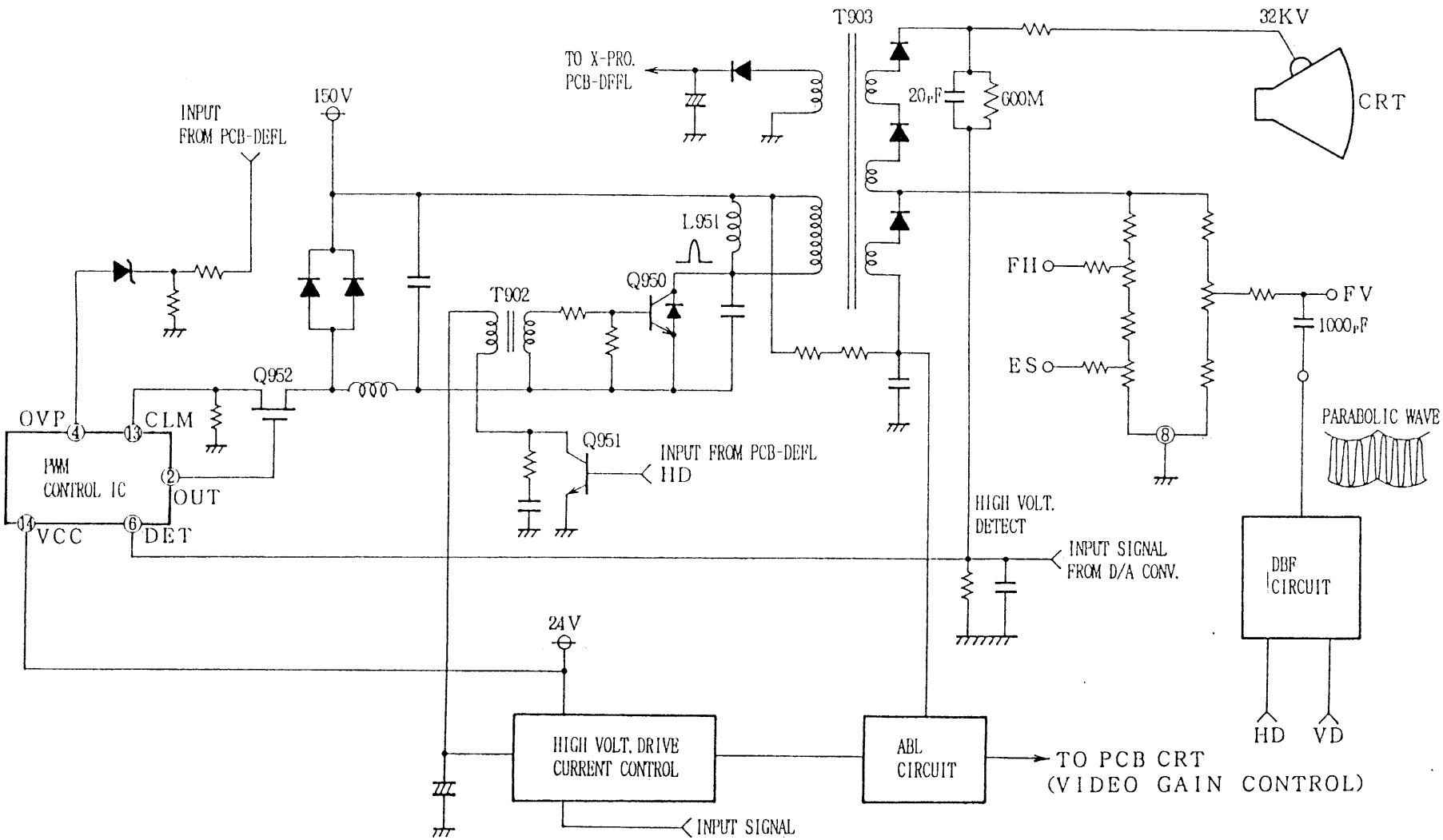
(4) IF EXCESSIVE VOLTAGE IS APPLIED TO ZENER DIODE OF D911, THIS VOLTAGE IS APPLIED TO ④ PIN ON IC905 THROUGH D911.
IN CASE OF THIS VOLTAGE REACHES TO OVER 2V, IC905 WILL STOP THE OUTPUT PULSE. THESE OPERATION CAN PROTECT THE OVER VOLTAGE TO Q901, Q902 AND OUTPUT LINE. IF NECESSARY TO RESTART THE MONITOR, IT SHOULD BE TURN OFF THE MAIN SWITCH AFTER RECOVERING.

(5) IF EXCESSIVE CURRENT GO THROUGH Q901 AND Q902(IN CASE OF OVER LOAD) THEN VOLTAGE OF ⑬ PIN OF IC905 REACHES TO OVER 200mV, IT OPERATES OVER CURRENT PROTECTION CIRCUIT IN IC905, AND IT SUPPRESS THE SWITCHING CURRENT TO Q901 AND Q902.

2) SECONDARY RECTIFYING AND SMOOTHING CIRCUIT

(1) THE MAGNETIC ENERGY IS ACCUMULATED IN THE PRIMARY WINDING OF T901 WHEN TURN ON Q901 AND Q902, WHICH IS INDUCED TO OUTPUT THE SECONDARY CIRCUIT IN TURNING OFF PERIODE OF Q901 AND Q902.

(2) ABOVE INDUCED VOLTAGE IS SUPPLIED FROM ⑩～⑫, ⑮～⑱ PIN ON T901, THEN THESE VOLTAGES ARE RECTIFIED AND SMOOTHED BY D930～D937, D939, D941 AND SMOOTHING CIRCUIT WHICH ARE SUPPLIED TO EACH POWER LINE.



BLOCK DIAGRAM OF HIGH VOLTAGE CIRCUIT

3-5 HIGH VOLTAGE CIRCUIT

1) HIGH VOLTAGE CIRCUIT

(1) THE OPERATION OF HIGH VOLTAGE CIRCUIT IS BASICALLY SAME AS HORIZONTAL DEFLECTION CIRCUIT.

(2) THE DRIVE PULSE OF HIGH VOLTAGE CIRCUIT IS APPLIED FROM HORIZONTAL DEFLECTION CIRCUIT WHICH DRIVE Q950.

THE COLLECTOR PULSE OF Q950 IS BOOSTED BY FLYBACK TRANS-FORMER OF T903 WHICH TO SUPPLY THE ANODE VOLTAGE.

THE BASE DRIVE CURRENT OF Q950 IS CONTROLLED TO OBTAIN THE CONSTANT COLLECTOR PULSE FOR APPLYING THE AUTO-TRACKING FUNCTION.

(3) IT IS NECESSARY TO STABILIZE THE HIGH VOLTAGE WHEN CHANGING THE BRIGHTNESS OF SCREEN, WHICH IS CONTROLLED BY POWER SUPPLY VOLTAGE OF HIGH VOLTAGE CIRCUIT.

(4) THE POWER SUPPLY VOLTAGE OF HIGH VOLTAGE CIRCUIT IS CONTROLLED BY IC906 AND Q952.

THE HIGH VOLTAGE OF ANODE IS DEVIDED BY INTERNAL RESISTOR OF FBT(APPROX. 600MΩ) AND R968, WHICH IS APPLIED TO ⑥ PIN OF IC906, THEN IT IS COMPARED WITH REFERENCE VOLTAGE IN IC906(2.5V).

WHEN THE HIGH VOLTAGE IS DECREASING AND ABOVE DEVIDED VOLTAGE REACHES TO LESS THAN REFERENCE VOLTAGE, THE PULSE DUTY OF ② PIN OF IC906 WILL BE CHANGING, WHICH CONTROLL TO INCREASE THE HIGH VOLTAGE.

(5) ALSO, THE HIGH VOLTAGE IS CONTROLLED BY OUTPUT SIGNAL FROM IC222(MPU).

2) HIGH VOLTAGE SAFETY CIRCUIT

—CAUTION—

SAFETY CIRCUITS DESCRIBED BELOW ARE EQUIPPED TO PREVENT ABNORMAL INCREASING OF THE HIGH VOLTAGE THAT MAY CAUSE X-RADIATION OF HARMFUL LEVEL.

NO MODIFICATION SHOULD BE APPLIED TO THE HIGH VOLTAGE SUPPLY AND SAFETY CIRCUIT.

(1) THE HIGH VOLTAGE CIRCUIT IS EQUIPPED TO THE DOUBLE SAFETY CIRCUIT.

(2) ONE IS THE OVER VOLTAGE PROTECTION CIRCUIT, AND ANOTHER IS X-RAY PROTECTION CIRCUIT.

(3) THE PULSE VOLTAGE FROM THIRD WINDING OF THE FLYBACK TRANSFORMER IS IN PROPORTION TO THE HIGH VOLTAGE, WHICH IS RECTIFIED AND SMOOTHED BY D955 AND C987 FOR USING THE DETECTION VOLTAGE OF HIGH VOLTAGE.

(4) THE DETECTED VOLTAGE FROM HIGH VOLTAGE CIRCUIT IS APPLIED TO ② PIN OF CNNECTOR "CP-2", THEN IT IS APPLIED TO ⑥ PIN OF IC510 VIA D518 AND D512 FOR X-RAY PROTECTION.

IT IS ALSO APPLIED TO ④ PIN OF IC906 VIA D518 AND D954 FOR OVER VOLTAGE PROTECTION.

THESE PROTECTION CIRCUITS ARE PROTECTED TO PREVENT THE INCREASING OF HIGH VOLTAGE AND POWER SUPPLY VOLTAGE OF HORIZONTAL DEFLECTION CIRCUIT.

(5) IN CASE OF HIGH VOLTAGE IS INCREASING, ABOVE VOLTAGE IS COMPARED WITH ZENER VOLTAGE OF D954 AND D512.

WHEN THE EXCESSIVE VOLTAGE(REACHES TO APPROX. 35KV) IS APPLIED TO D954 AND D512, IT MAY OPERATE THE X-RAY PROTECTION CIRCUIT IN IC510 AND THE OVER VOLTAGE PROTECTION CIRCUIT IN IC906.

(6) IN CASE OF POWER SUPPLY VOLTAGE OF HORIZONTAL DEFLECTION IS INCREASING, THE DETECTED VOLTAGE IS COMPARED WITH ZENER VLTAGE OF D543.

IT ALSO OPERATES THE OVER VOLTAGE PROTECTION CIRCUIT IN IC906.

(7) THESE OPERATION WILL STOP THE OSCILLATION OF IC510 AND IC906.

(8) SO, BOTH IC WILL KEEP THE NO-OPERATION CONDITION UNTIL THE MAIN POWER SWITCH WILL BE TURNED OFF BY THE OPERATER.

(9) THE HIGH VOLTAGE CIRCUIT HAS THE OVER CURRENT PROTECTION CIRCUIT.

(10) WHEN THE EXCESSIVE CURRENT INFLOW THE HIGH VOLTAGE CIRCUIT THEN IT WILL BE INCREASING THE VOLTAGE OF R959, SO THAT THE VOLTAGE OF ⑬ PIN ON IC906 REACHES TO OVER 200mV WHICH OPERATES THE OVER CURRENT PROTECTION CIRCUIT IN IC906, THEN IT REDUCE THE CURRENT OF Q952.

3-6 DBF CIRCUIT

(1) THE PARABOLIC WAVE FROM DEFLECTION CIRCUIT IS APPLIED TO AMPLIFIER OF Q955, Q956 AND Q957, WHICH IS APPLIED TO FOCUS CIRCUIT IN FLYBACK TRANSFORMER FOR MODULATION.

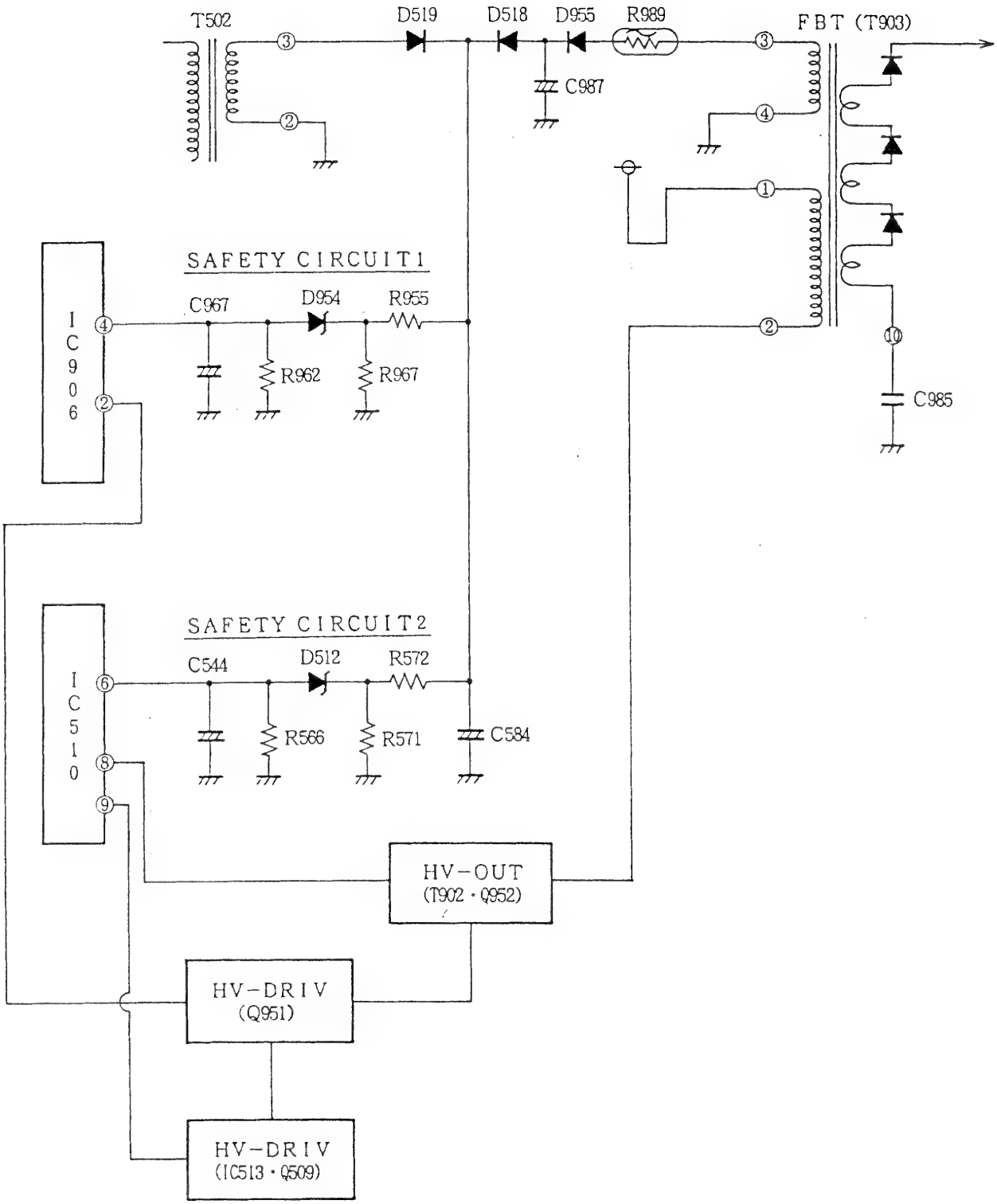
(2) THE PHASE OF PARABOLIC WAVE BETWEEN INPUT AND OUTPUT OF DBF CIRCUIT IS SYNCHRONIZED BY FEED BACK CIRCUIT OF R984, R985 AND C958, WHICH IS FED BACK TO BASE OF Q957.

3-7 ABL CIRCUIT

(1) ABL(AUTOMATIC BEAM CURRENT LIMITTER) CIRCUIT MAY LIMIT TO THE CRT BEAM CURRENT, WHICH TO PREVENT THE CRT PHOSPHOR BURNING AT THE ABNORMAL CONDITION.

(2) THE CRT BEAM CURRENT IS FED FROM 150V LINE OF ⑫ PIN ON T901, AND IT IS DETECTED BY VOLTAGE OF R976 AND R977.

(3) WHEN THE CRT BEAM CURRENT EXCEEDS LIMIT VALUE, THE BASE VOLTAGE OF Q605 IS DECREASING ACROSS R976 AND R977, SO THAT THE EMITTER VOLTAGE OF Q605 IS DECREASING.
THESE OPERATION SUPPRESS THE GAIN OF VIDEO AMPLIFIER OF IC601, WHICH TO OBTAIN THE CONSTANT BRIGHTNESS ON THE SCREEN.



BLOCK DIAGRAM OF HIGH VOLT. SAFETY CIRCUIT

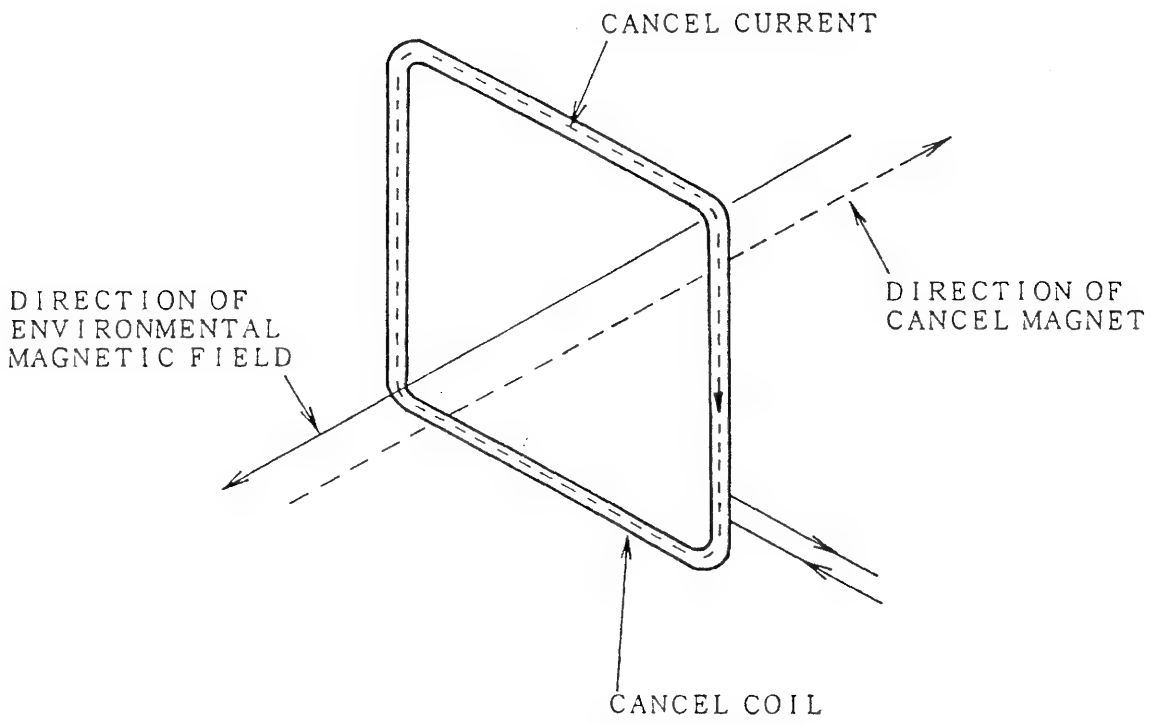
3-8 CANCEL COIL CIRCUIT

(1) THE LARGE SIZE CRT IS VERY SENSITIVE TO THE ENVIRONMENTAL MAGNETIC FIELD SUCH LIKE A EARTH MAGNETIC, WHICH MAKES BAD PURITY CONDITION.

(2) THE CANCEL COIL IS MOUNTED ON AROUND THE CRT FACE WHICH MAKES CACEL MAGNET AGAINST THE ENVIRONMENTAL MAGNETIC FIELD.

(3) THE CANCEL CURRENT IS DETERMINED BY OUTPUT SIGNAL FROM IC222, WHICH CONTROLL THE DIRECTION AND VALUE OF CURRENT.

(4) THIS FUNCTION IS USED FOR COMPENSATION OF PURITY CONDITION AT INSTALLATION.



4. VIDEO CIRCUIT

4-1 INPUT VIDEO SIGNAL

INPUT SIGNAL IS AVAILABLE FOR TWO CHANNELS VIDEO SIGNAL(NTSC, M-NTSC, PAL, SECAM), TWO CHANNELS ANALOG RGB VIDEO SIGNAL, AND ONE CHANNEL TTL RGB VIDEO SIGNAL, WHICH IS SHOWN AS SECTION 3.3 IN SPECIFICATION.

ONE OF THE TWO CHANNELS VIDEO SIGNAL CAN SELECT THE SEPARATED Y(BRIGHTNESS)/C (CHROMACITY) VIDEO SIGNAL(S-VHS).

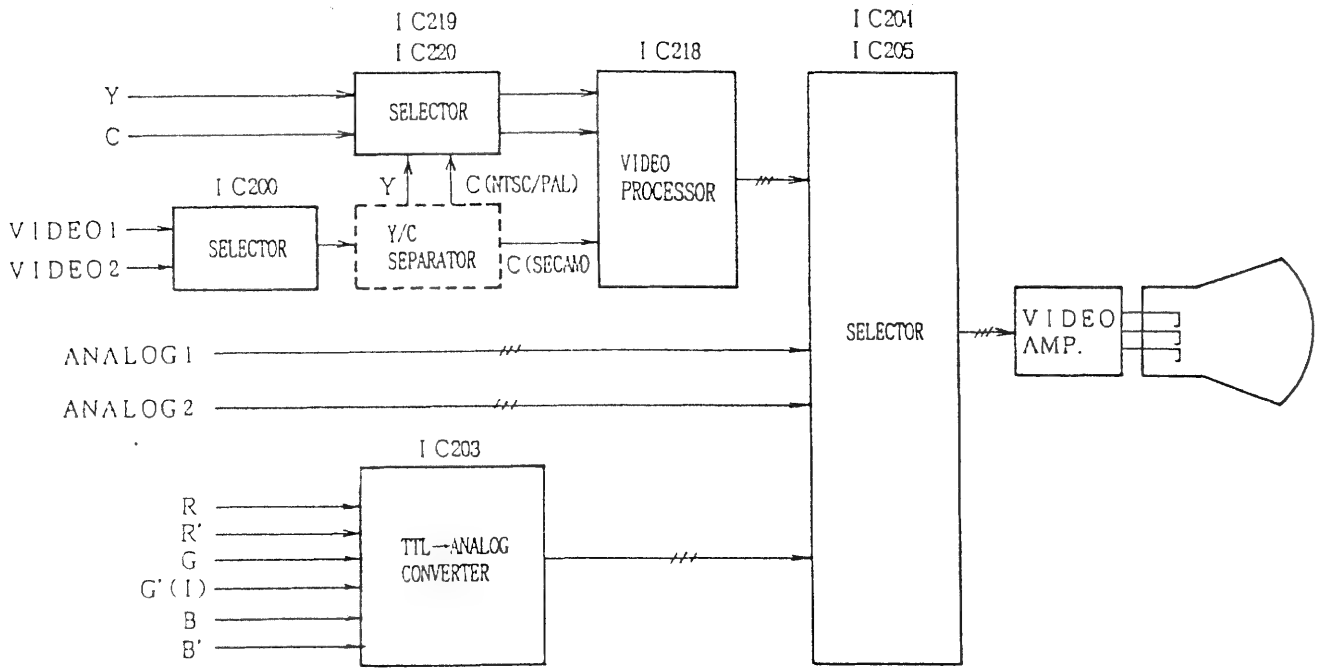
4-2 SELECTION OF INPUT SIGNAL

(1) VIDEO 1 OR 2 SIGNAL IS SELECTED BY IC200, WHICH SIGNAL OR SEPARATED Y/C VIDEO SIGNAL IS SELECTED BY IC219 AND IC220, SO THAT SELECTED SIGNAL IS APPLIED TO IC 218 OF VIDEO PROCESSING CIRCUIT.

IC218 PROVIDES THE SEPARATED RGB PRIMARY VIDEO SIGNAL TO ANALOG SWITCH OF IC204 AND IC205.

(2) TTL SIGNAL IS CONVERTED TO ANALOG LEVEL BY GATE ARRAY OF IC203, WHICH IS APPLIED TO ANALOG SWITCH OF IC204 AND IC205.

(3) IC204 AND IC205 CAN SELECT ONE CHANNEL RGB SIGNAL IN FOUR CHANNEL SIGNALS(ONE CHANNEL VIDEO, TWO CHANNEL ANALOG RGB, ONE CHANNEL TTL RGB), WHICH IS APPLIED TO VIDEO AMPLIFIER CIRCUIT.



BLOCK DIAGRAM OF INPUT SIGNAL PROCESSING

4-3 VIDEO SIGNAL

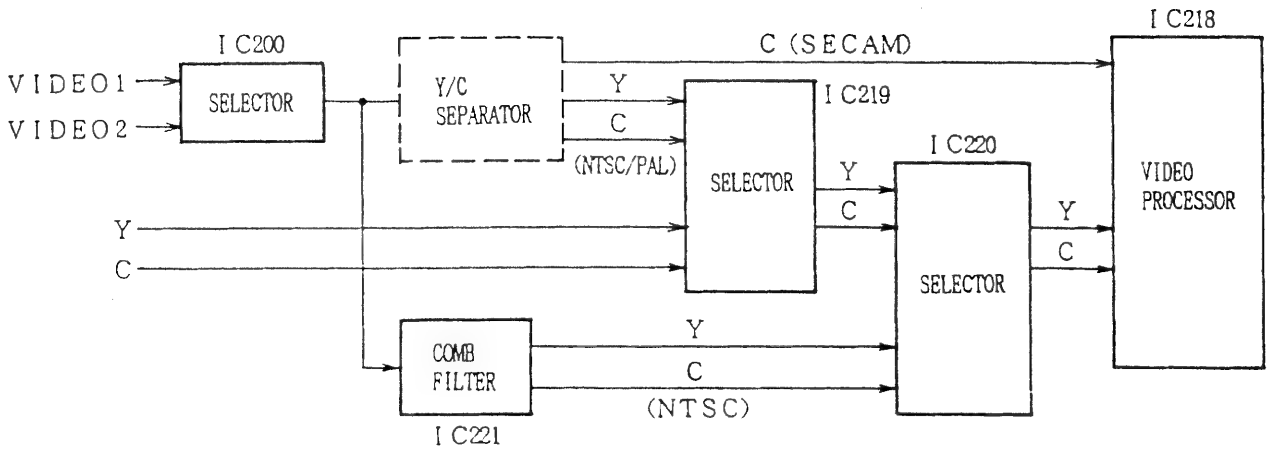
(1) VIDEO SIGNAL IS APPLIED FROM BNC CONNECTOR OR RCA JACK ON REAR PANEL, WHICH IS TERMINATED BY 75Ω IMPEDACE IN NORMAL OPERATION.

(2) WHEN THE MONITOR IS USED FOR LOOP THROUGH CONNECTION, THE TERMINATION SWITCH SHOULD SELECT TO "HIGH" IMPEDANCE POSITION WITH USING T-COUPLER, THEN THE FINAL MONITOR SHOULD BE SELECTED TO "75Ω" IMPEDANCE POSITION.

(3) VIDEO SIGNAL IS APPLIED TO ANALOG SWITCH OF IC200 THROUGH THE COUPLING CAPACITOR OF C2H8 AND C2H9.

(4) IC200 CAN SELECT VIDEO 1 SIGNAL WHEN ④, ⑥ AND ⑬ PIN IS "HIGH" LEVEL, AND ALSO SELECT VIDEO 2 SIGNAL WHEN ④, ⑥ AND ⑬ PIN IS "LOW" LEVEL.

(5) THE SELECTED VIDEO SIGNAL IS SEPARATED TO Y(BRIGHTNESS) AND C(CHROMACITY) SIGNAL BY PARIPHERAL CIRCUIT OF IC218 WHICH IS SHOW AS BELOW.
(NTSC SIGNAL IS APPLIED TO COMB FILTER CIRCUIT OF IC221.)
THE SEPARATED Y/C SIGNAL OR Y/C SIGNAL FROM S-TERMINAL ON REAR PANEL IS SELECTED BY IC219, WHICH SIGNAL OR SEPARATED Y/C SIGNAL BY COMB FILTER CIRCUIT IS SELECTED BY IC220, THEN THEY ARE APPLIED TO IC218 OF VIDEO PROCESSING CIRCUIT.
HOWEVER, C SIGNAL OF SECAM IS DIRECTLY APPLIED TO ⑱ PIN OF IC218 AFTER THROUGH THE SEPARATOR CIRCUIT.



BLOCK DIAGRAM OF VIDEO SIGNAL PROCESSING CIRCUIT

(6) IC219 CAN SELECT THE SIGNAL FROM S-TERMINAL WHEN ⑨, ⑩ AND ⑪ PIN OF IC219 IS "HIGH" LEVEL, AND ALSO SELECT THE SEPARATED Y/C SIGNAL FROM PERIPHERAL CIRCUIT OF IC218 WHEN ⑨, ⑩ AND ⑪ PIN IS "LOW" LEVEL.

(7) IC220 CAN SELECT THE SIGNAL FROM COMB FILTER CIRCUT WHEN ⑨, ⑪ PIN IS "HIGH" LEVEL, AND ALSO SELECT THE SIGNAL FROM IC219 WHEN ⑨, ⑪ PIN IS "LOW" LEVEL.

(8) THE SEPARATED Y/C SIGNAL IS APPLIED TO ⑳ AND ㊽ PIN OF IC218.
⑪ PIN OF IC218 PROVIDES "HIGH" LEVEL SIGNAL WHEN INPUT 4.58MHz-NTSC, PAL, AND SECAM VIDEO SIGNAL, IT ALSO PROVIDES "LOW" LEVEL SIGNAL WHEN INPUT SIGNAL IS 3.58MHz-NTSC VIDEO SIGNAL.
SO, IC220 CAN SELECT THE VIDEO SIGNAL ACCORDING TO ABOVE INPUT SIGNAL THROUGH Q216, Q217 AND Q227.

(9) THE Y/C SIGNAL IS APPLIED TO IC218, WHICH PROVIDES THE RGB PRIMARY SIGNAL BY ㊶, ㊷ AND ㊸ PIN, THEN THEY ARE APPLIED TO ANALOG SWITCH OF IC204 AND IC205.

4-4 ANALOG RGB SIGNAL

(1) THE ANALOG RGB SIGNAL IS APPLIED FROM BNC CONNECTOR AND D-SUB CONNECTOR ON REAR PANEL.

(2) THE TERMINATION OF INPUT SIGNAL IS USED FOR "75Ω" IMPEDANCE POSITION IN NORMAL OPERATION.
HOWEVER, IT IS USED FOR "HIGH" IMPEDANCE POSITION WITH T-COUPLER WHEN OPERATES THE ROOP THROUGH CONNECTION, THEN THE FINAL TERMINATION SHOULD SELECT TO "75Ω" IMPEDANCE POSITION.

(3) THE ANALOG 1 INPUT SIGNAL IS APPLIED TO ANALOG SWITCH OF IC204 AND IC205 THROUGH THE COUPLING CAPACITOR OF C2K4～C2K9 AND EMITTER FOLLOWER OF Q255～Q257.

(4) THE ANALOG 2 INPUT SIGNAL IS ALSO APPLIED TO ANALOG SWITCH OF IC204 AND IC205 THROUGH THE COUPLING CAPACITOR OF C2J4～C2J9 AND EMITTER FOLLOWER OF Q260～Q262, WHICH SIGNAL IS APPLIED TO THE EXTERNAL RGB TERMINAL OF ㊼, ㊾, ㊿ PIN OF IC218.

4-5 TTL RGB SIGNAL

(1) THE TTL RGB SIGNAL IS APPLIED FROM D-SUB CONNECTOR ON REAR PANEL WITH R, R', G, G'/I, B, B' OF INPUT SIGNAL, WHICH ARE TERMINATED TO 330Ω AGAINST GND LEVEL AND 470Ω AGAINST 5V LEVEL.

(2) THE TTL INPUT SIGNAL IS CONVERTED TO ANALOG LEVEL SIGNAL BY IC203 WITH PERIPHERAL CIRCUIT, WHICH IS APPLIED TO ANALOG SWITCH OF IC204 AND IC205.

(3) THE DISPLAY COLOR IS SELECTED BY INPUT SIGNAL TO ⑤ AND ⑥ PIN OF IC203 FROM IC222 (MPU), WHICH IS SHOWN AS BELOW.

	8 COLORS	SAT. 16 COLORS	PASTEL 16 COLORS	64 COLORS
⑤ PIN	L	H	L	H
⑥ PIN	L	L	H	H

H : 5 V L : 0 V

4-6 SELECTION OF INPUT SIGNAL

THE INPUT SIGNAL IS SELECTED BY INPUT SIGNAL OF ⑨ AND ⑩ PIN ON IC204 AND IC205 FROM IC222 (MPU), WHICH IS SHOWN AS BELOW.

	VIDEO	ANALOG 1	ANALOG 2	TTL
⑨ PIN	H	L	H	L
⑩ PIN	H	L	L	H

4-7 CHARACTER DISPLAY

(1) IC230 PROVIES THE CHARACTER SIGNAL OF RGB WHICH IS APPLIED TO ANALOG SWITCH OF IC206.

(2) THE SELECTION SIGNAL BETWEEN NORMAL VIDEO AND CHARACTER IS DETERMINED BY INPUT SIGNAL TO ⑨, ⑩ AND ⑪ PIN OF IC206 FROM IC222(MPU).
THE CHARACTER SIGNAL IS DISPLAYED AT "HIGH" LEVEL, AND THE NORMAL VIDEO SIGNAL IS DISPLAYED AT "LOW" LEVEL INPUT SIGNAL.

(3) IC206 IS SWITCHED BY HIGH SPEED SELECTION SIGNAL BETWEEN CHACTER AND VIDEO SIGNAL, SO THAT WHICH MAKES OVERLAPPED DISPLAY IMAGE ON THE SCREEN.

4-8 CRT AMPLIFIER CIRCUIT

(1) THE SELECTED RGB SIGNAL BY ANALOG SWITCH OF IC204 AND IC205 IS APPLIED TO THE VIDEO AMP OF IC601 ON CRT BOARD THROUGH THE COUPLING CAPACITOR OF C6R1, C6G1, C6B1, C6R2, C6G2, AND C6B2.

(2) IC601 HAS FOLLOWING FUNCTION TO CONTROL THE VIDEO SIGNAL.

④, ⑧, ⑫ PIN : RGB DRIVE CONTROL

⑯ PIN : BRIGHTNESS CONTROL

⑭ PIN : CONTRAST CONTROL

THE OUTPUT SIGNAL IS FED FROM ㉑, ㉕ AND ㉙ PIN OF IC601 AFTER CONTROLLED BY ABOVE FUNCTION.

(3) ⑮ PIN OF IC601 IS USED FOR THE CLAMP PULSE INPUT TERMINAL, AND IS APPLIED FROM CLAMP PULSE CIRCUIT IN VIDEO BOARD, WHICH MAY CLAMP THE PEDESTAL LEVEL OF VIDEO SIGNAL.

(4) THE OUTPUT SIGNAL FROM IC601 IS APPLIED TO VIDEO AMP. WHICH IS COSISTED BY VOLTAGE AMP., PUSH-PULL EMITTER FOLLOWER AND CLAMP CIRCUIT.

(5) THE VOLTAGE AMP., WHICH IS CONSTRUCTED BY CASCADE AMP. AMPLIFIES APPROX. 85Vp-p AT RGB INPUT AND APPROX. 140Vp-p AT VIDEO INPUT.

(6) THE CLAMP CIRCUIT HAS DC VOLTAGE CONTROL FUNCTION, WHICH OPERATES TO CLAMP THE CATHODE VOLTAGE OF D6R3, D6G3 AND D6B3 ON APPROX. 190V AT ZERO AMPERE OF THE COLLECTOR CURRENT OF Q6R6, Q6G6, Q6B6.
WHEN THE COLLECTOR CURRENT OF Q6R6, Q6G6 AND Q6B6 REACHES APPROX. 1mA, THE CATHODE VOLTAGE OF D6R3, D6G3 AND D6B3 IS APPROX. 220V, WHICH OPERATES TO CLAMP THE MAX. VIDEO SIGNAL TO 220V.

5. SYNC. SIGNAL CIRCUIT

5-1 INPUT SYNC. SIGNAL

IT IS AVAILABLE FOR THE FOLLOWING SYNC. SIGNAL.

(1) SEPARATED HORIZONTAL/VERTICAL SYNC. :

0.3～4Vp-p(TTL), POS./NEG. POLARITY

(2) COMPOSITE HORIZONTAL/VERTICAL SYNC. :

0.3～4Vp-p(TTL), POS./NEG. POLARITY

(3) SYNC. ON GREEN:

0.3V(FOR SYNC. SIGNAL), NEG. POLARITY

5-2 SYNC. SIGNAL FOR VIDEO INPUT

(1) THE SELECTED VIDEO SIGNAL BY IC200 IS APPLIED TO ⑬ PIN OF IC218, WHICH SEPARATES SYNC. SIGNAL, THEN HORIZONTAL SYNC. SIGNAL IS PROVIDED FROM PIN AND VERTICAL SYNC. SIGNAL IS PROVIDED FROM ㉙ PIN.

(2) ABOVE OUTPUT SIGNAL IS APPLIED TO ① AND ⑫ PIN OF ANALOG SWITCH OF IC207.

5-3 SYNC. SIGNAL FOR ANALOG 1 INPUT

(1) THE CHANNEL OF ANALOG 1 IS AVAILABLE FOR SEPARATED HORIZONTAL/VERTICAL SYNC. SIGNAL, HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL AND SYNC. ON GREEN SIGNAL.

(2) THE INPUT SIGNAL IS APPLIED FROM BNC CONNECTOR ON REAR PANEL WHICH CAN SELECT THE TERMINATION OF "HIGH" OR "75Ω".

(3) THE HORIZONTAL SYNC. AND HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL IS APPLIED TO ④ PIN OF IC207 THROUGH THE COUPLING CAPACITOR C2K2, BUFFER AMP. Q263 AND S208.

(4) THE VERTICAL SYNC. SIGNAL IS APPLIED TO ⑪ PIN OF IC207 THROUGH THE COUPLING CAPACITOR C2K3, BUFFER AMP. Q264.

(5) THE SYNC. ON GREEN SIGNAL IS APPLIED TO ④ PIN OF IC207 THROUGH THE COUPLING CAPACITOR C2K5, C2K8, BUFFER AMP. Q256 AND S208.

5-4 SYNC. SIGNAL FOR ANALOG 2 INPUT

(1) THE CHANNEL OF ANALOG 2 IS AVAILABLE FOR SEPARATED HORIZONTAL/VERTICAL SYNC. SIGNAL AND HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL.

(2) THE SELECTION OF TERMINATION OF "HIGH" OR "75Ω" IS SELECTABLE BY PIN IN D-SUB CONNECTOR.

(3) THE SEPARATED HORIZONTAL SYNC. SIGNAL AND HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL IS APPLIED TO ⑤ PIN OF IC207 THROUGH THE COUPLING CAPACITOR C2J0, C2J1 AND BUFFER AMP. Q258.

(4) THE SEPARATED VERTICAL SYNC. SIGNAL IS APPLIED TO ⑭ PIN OF IC207 THROUGH THE COUPLING CAPACITOR C2J2, C2J3 AND BUFFER AMP. Q359.

5-5 SYNC. SIGNAL FOR TTL INPUT

(1) THE CHANNEL OF TTL INPUT IS AVAILABLE FOR SEPARATED HORIZONTAL/VERTICAL SYNC. SIGNAL AND HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL.

(2) THE SEPARATED HORIZONTAL SYNC. SIGNAL AND HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL IS APPLIED TO ② PIN OF IC207 VIA INVERTER OF IC237.

(3) THE SEPARATED VERTICAL SYNC. SIGNAL IS APPLIED TO ⑮ PIN OF IC207 VIA INVERTER OF IC237.

5-6 SELECTION OF SYNC. SIGNAL

(1) THE SELECTION OF SYNC. SIGNAL IS PERFORMED BY ANALOG SWITCH OF IC207.

(2) THE DISCRIMINATION OF SYNC. SIGNAL IS PERFORMED BY MPU OF IC222, WHICH PROVIDES THE SELECTION SIGNAL FROM ⑦ AND ⑧ PIN, THEN IT IS APPLIED TO ⑨ AND ⑩ PIN OF IC207 VIA Q245 AND Q246.

(3) THE SELECTION SIGNAL ON ⑨ AND ⑩ PIN OF IC207 IS AS FOLLOWS.

	VIDEO	ANALOG 1	ANALOG 2	TTL
⑨ PIN	L	H	L	H
⑩ PIN	L	H	H	L

H : 1 2 V L : 0 V

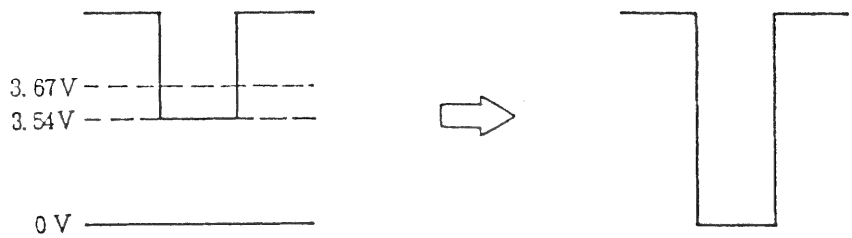
5-7 DETECTION OF SYNC. SIGNAL

(1) THE SELECTED SYNC. SIGNAL BY IC207 IS APPLIED TO ④ AND ⑨ PIN OF COMPARATOR OF IC209 AND IC210 THROUGH C2G7 AND C2D9.

(2) THE APPLIED SYNC. SIGNAL TO ⑨ PIN OF IC209 AND IC210 IS COMPARED WITH VOLTAGE OF ⑩ PIN(3.54V).
WHEN THE VOLTAGE OF SYNC. SIGNAL IS SMALLER THAN ⑩ PIN, ⑦ PIN PROVIDES "LOW" LEVEL SIGNAL, THEN Q247 OPERATES TO INCREASE THE VOLTAGE OF ⑨ PIN.
WHEN THE VOLTAGE OF SYNC. SIGNAL IS BIGGER THAN ⑩ PIN, ⑦ PIN PROVIDES "HIGH" LEVEL SIGNAL, THEN Q247 OPERATES TO TURN OFF, SO THAT VOLTAGE OF ⑨ PIN WILL HOLD THE PRESENT VALUE.

(3) SO, THE MIN. VOLTAGE OF INPUT SIGNAL WILL BE HELD TO 3.54V BY ABOVE OPERATION.

(4) THE CLAMPED VOLTAGE TO 3.54V IS COMPARED WITH VOLTAGE OF ⑤ PIN(3.67V).
WHEN THE VOLTAGE OF SYNC. SIGNAL SMALLER THAN ⑤ PIN, ⑫ PIN PROVIDES "LOW" LEVEL SIGNAL.
THE OUTPUT SIGNAL FROM ⑫ PIN WILL BE REFORMED TO BELOW.



5-8 SYNC. SEPARATION

(1) THE DETECTED SYNC. SIGNAL IS FIXED TO NEGATIVE POLARITY BY IC213 AND IC211, THEN THE SEPARATED HORIZONTAL SYNC. SIGNAL AND HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL IS APPLIED TO SYNC. SEPARATION CIRCUIT, WHICH IS CONSISTED BY IC215 AND IC216.

(2) WHEN THE INPUT SIGNAL IS HORIZONTAL/VERTICAL COMPOSITE SYNC. THE HORIZONTAL SYNC. SIGNAL IS FED FROM⑥ PIN OF IC217, AND THE VERTICAL SYNC. SIGNAL IS FED FROM ⑤ PIN OF IC216.

(3) WHEN THE SEPARATED HORIZONTAL SYNC. SIGNAL IS APPLIED FROM BNC CONNECTOR, ⑥ PIN OF IC217 PROVIDES THE HORIZONTAL SYNC. SIGNAL, AND ⑤ PIN OF IC216 PROVIDES THE "HIGH" LEVEL SIGNAL.

(4) IN CASE OF SEPARATED VERTICAL SYNC. SIGNAL, THE DETECTED VERTICAL SYNC. SIGNAL IS APPLIED TO ⑤ PIN OF IC212, THEN "HIGH" LEVEL SIGNAL IS APPLIED TO ④ PIN OF IC212 FROM ⑤ PIN OF IC216, SO THAT IC212 PROVIDES VERTICAL SYNC. SIGNAL.

(5) IN CASE OF HORIZONTAL/VERTICAL COMPOSITE SYNC. SIGNAL AND SYNC. ON GREEN SIGNAL, THE OUTPUT SIGNAL FROM VERTICAL SYNC. DETECTION CIRCUIT IS CLAMPED TO "LOW" LEVEL, AND ⑤ PIN OF IC212 IS CLAMPED TO "HIGH" LEVEL, THEN THE SEPARATED VERTICAL SYNC. SIGNAL IS APPLIED TO ④ PIN OF IC212, SO THAT IC212 PROVIDES THE SEPARATED VERTICAL SYNC. SIGNAL.

(6) AS THE RESULT OF THESE OPERATION, ⑥ PIN OF IC217 PROVIDES THE HORIZONTAL SYNC. SIGNAL, AND ⑥ PIN OF IC213 PROVIDES THE VERTICAL SYNC. SIGNAL, WHICH ARE USED FOR THE DRIVE PULSE OF DEFLECTION CIRCUIT.

6. MPU AND PERIPHERAL CIRCUIT

6-1 FUNCTION OF MPU

1) THERE IS 8-BIT MICROPROCESSOR ON THE VIDEO BOARD WHICH HAS THE FOLLOWING FUNCTION.

(1) POWER ON/OFF CONTOROL

(2) DISCRIMINATION OF HORIZONTAL/VERTICAL FREQUENCY

(3) C_S, C_R etc. SELECTION SIGNAL CONTROL

(4) SOURCE AND MODE SELECTION CONTROL

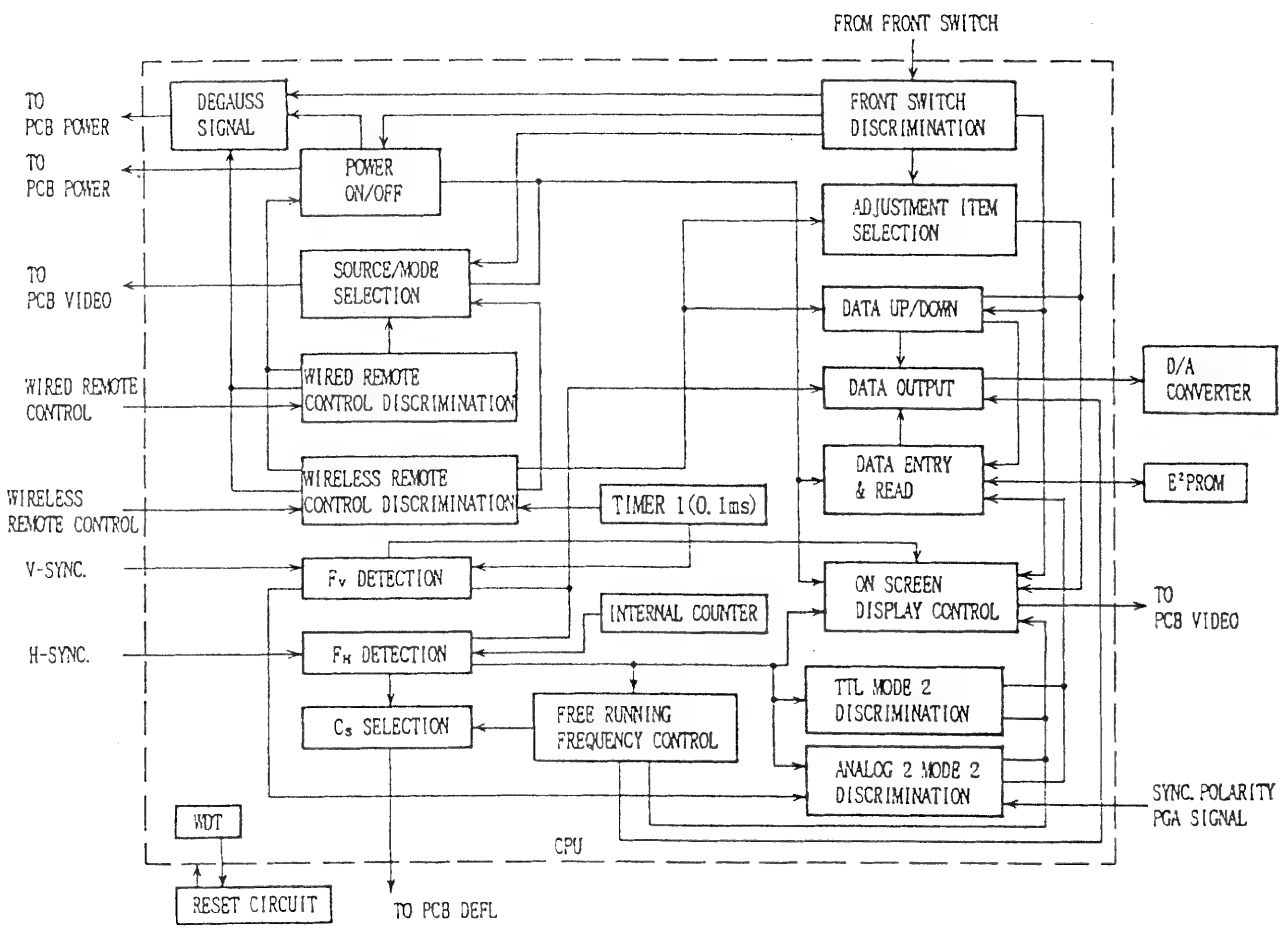
(5) DISCRIMINATION OF REMOTE CONTROL SIGNAL

(6) D/A CONVERTER CONTROL

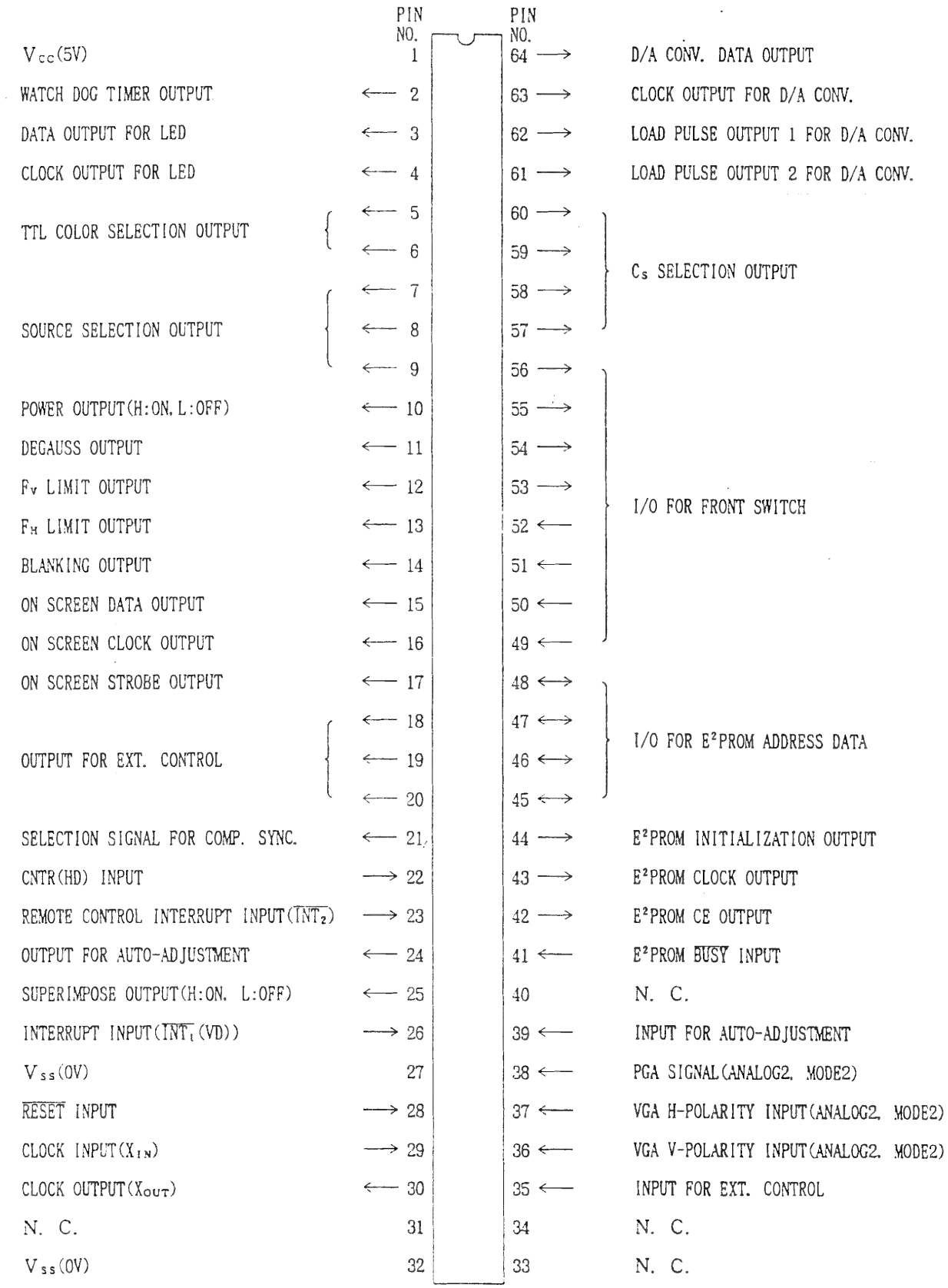
(7) READ OR WRITE OPERATION TO E^2PROM

(8) ON SCREEN DISPLAY CONTROL

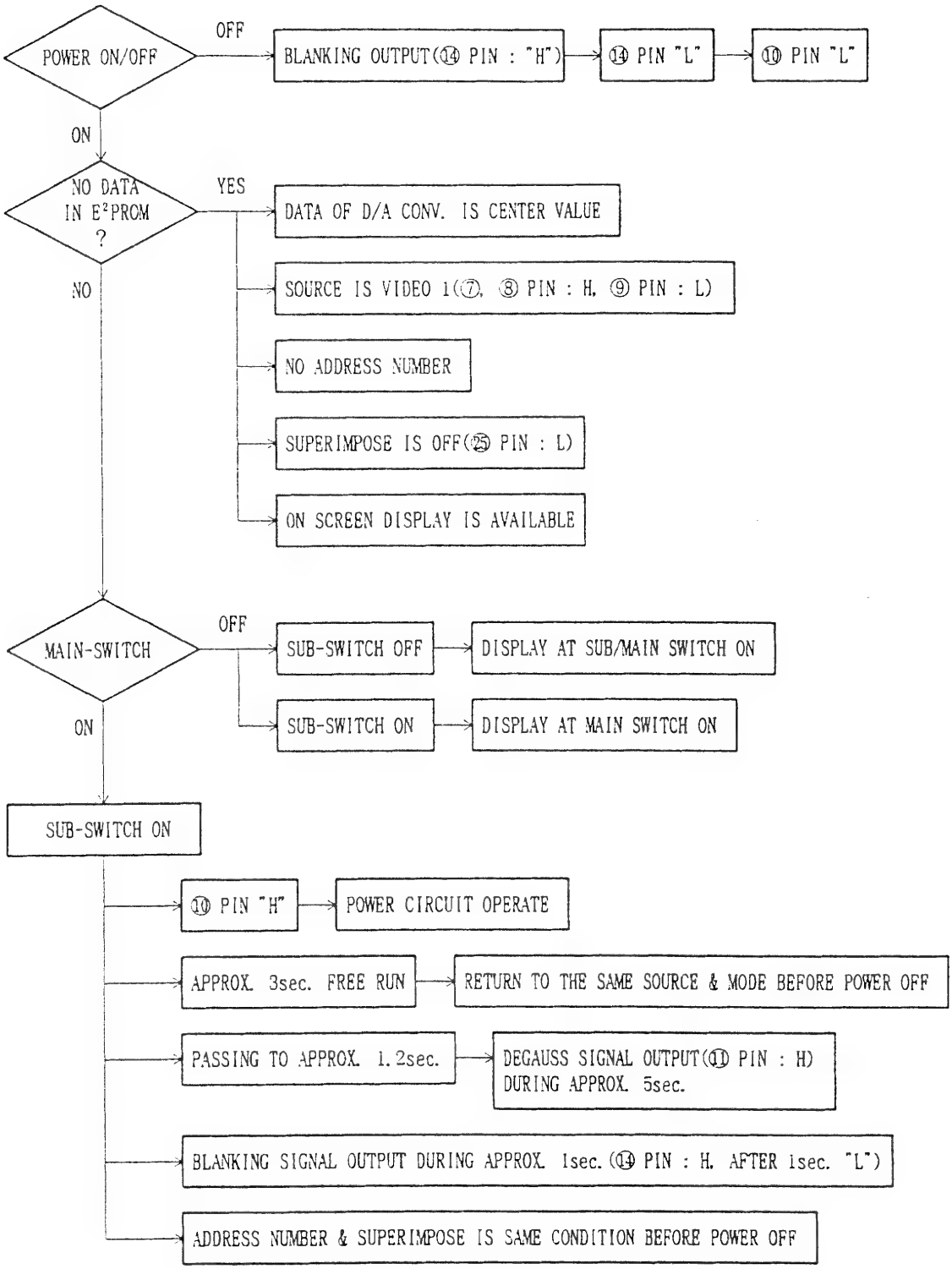
2) INTERNAL BLOCK DIAGRAM OF MPU



3) PIN ASSIGNMENT & I/O OF MPU(IC222)



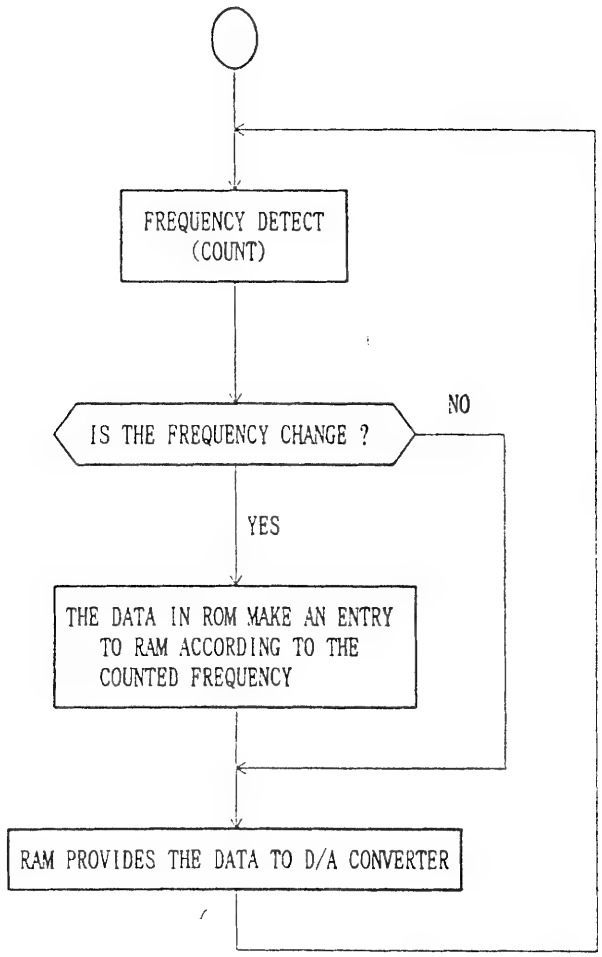
6-2 FLOW CHART OF POWER ON/OFF(OPERATION OF IC222)



6-3 HORIZONTAL/VERTIVCAL FREQUENCY DETECTION WITH SELECTION SIGNAL

1) FLOW CHART OF FREQUENCY DETECTION

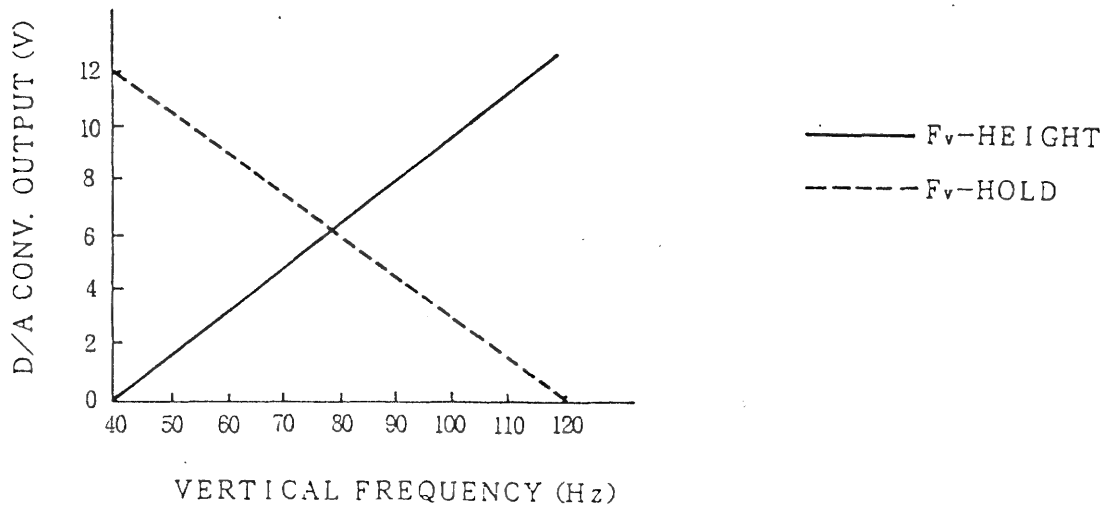
THE FREQUNECY IS DETECTED BY MPU OF IC222 WHICH CONTROLL TO STABILIZE THE OPERATION OF AUTO-TRACKING CIRCUIT IN WIDE FREQUENCY RANGE.



2) VERTICAL FREQUENCY(F_v) DETECTION

(1) THE VERTICAL FREQUENCY IS COUNTED BY INPUT SIGNAL OF ㉖ PIN OF IC222.

(2) THE OUTPUT SIGNAL OF D/A CONVERTER HAS THE FOLLOWING CHARACTERISTICS, WHICH TO OBTAIN THE AUTO-TRACKING FUNCTION AND CONSTANT VERTICAL HEIGHT IN WIDE FREQUENCY RANGE.



(3) FV-HOLD AND FV-HEIGHT DATA IS SELECTED BY DATA OF ROM IN IC222.

(4) IC403 PROVIDES THE FOLLOWING ADJUSTMENT SIGNAL.

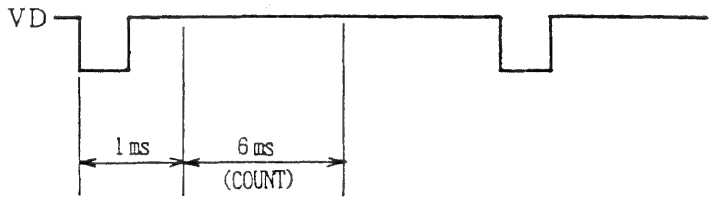
⑪ PIN : F_V-HOLD , ⑩ PIN : F_V-HEIGHT

(5) THE DETECTED VERTICAL FREQUENCY IS USED FOR THE CONTROL SIGNAL OF DISPLAY POSITION AT THE ON SCREEN DISPLAY.

(6) ALSO, THE DETECTED VERTICAL FREQUENCY IS USED FOR THE DISCRIMINATION OF LIMIT FREQUENCY.

3) HORIZONTAL FREQUENCY(F_H) DETECTION

(1) THE HORIZONTAL FREQUENCY IS DETECTED BY INPUT SIGNAL TO ㉒ PIN OF IC222 IN THE FOLLOWING PERIOD(6ms).

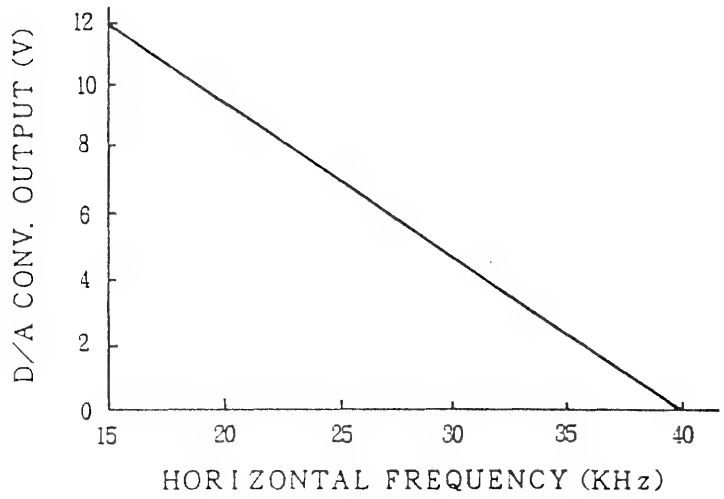


(2) THE DETECTED HORIZONTAL FREQUENCY IS USED FOR C_S SELECTION, ON SCREEN DISPLAY CONTROL AND LIMIT FREQUENCY DISCRIMINATION.

(3) THE DETECTED SIGNAL("HA") IS PROVIDED FROM ⑫ PIN OF IC233, WHICH SIGNAL IS CONTROLLED BY MPU OF IC222.

(4) ABOVE "HA" SIGNAL IS USED FOR THE DRIVE CONTROL OF BASE OF Q950, WHICH IS CONTROLLED BY Q961 AND Q962 THROUGH T902.

(5) THE CHARACTERISTICS OF HORIZONTAL FREQUENCY VS. D/A CONVERTER(IC233) OUTPUT IS AS FOLLOWS.

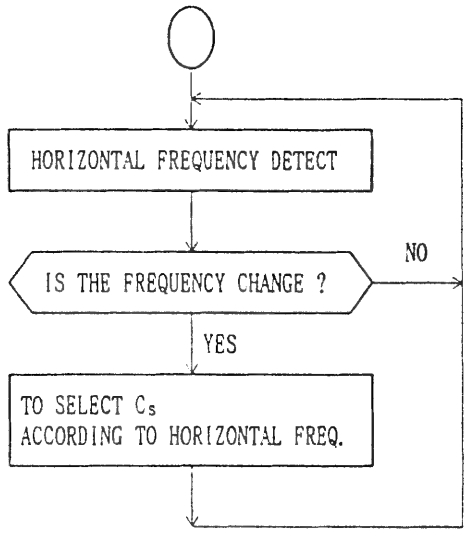


4) C_S SELECTION

(1) THE C_S IS SELECTED BY OUTPUT SIGNAL OF ⑤⑦ ~ ⑥⓪ PIN OF IC222 ACCORDING TO THE FOLLWOING TABLE, WHICH TO OBTAIN THE OPTIMUM LINEARITY IN WIDE FREQUENCY RANGE.

HORIZONTAL FREQUENCY	⑤⑦ PIN	⑤⑧ PIN	⑤⑨ PIN	⑥⓪ PIN
LESS THAN 16.9KHz	L	L	L	L
16.9 ~ 18.8KHz	L	L	H	H
18.8 ~ 20.9KHz	H	L	L	H
20.9 ~ 23.3KHz	H	L	H	L
23.3 ~ 26.0KHz	H	H	L	L
26.0 ~ 29.0KHz	H	H	L	H
29.0 ~ 32.3KHz	H	H	H	L
MODE THAN 32.3KHz	H	H	H	H

(2) FLOW CHART OF C_S SELECTION



5) VERTICAL LINEARITY(V-LIN. S) CONTROL

(1) IT IS NECESSARY TO CONTROLL THE VERTICAL LINEARITY IN WIDE FREQUENCY RANGE, WHICH IS CONTROLLED BY OUTPUT VOLTAGE OF ⑫ PIN ON IC401.

(2) THE OUTPUT OF IC401 IS MODULATED BY PARABOLIC WAVE, WHICH VOLTAGE IS CONTROLLED TO INCREASE BY IC222, WHEN THE VERTICAL FREQEUNCY IS INCREASING.

6-4 SOURCE/MODE SELECTION

1) SOURCE SELECTION

(1) THE INPUT SIGNAL SOURCE IS SELECTED BY OUTPUT SIGNAL FROM MPU OF IC222, WHICH SHOWN AS BELOW.

SOURCE	⑦ PIN	⑧ PIN	⑨ PIN
VIDEO 1	H	H	L
VIDEO 2	H	H	H
ANALOG 1	L	L	H
ANALOG 2	H	L	L
TTL	L	H	L

(2) ⑭ PIN OF IC222 PROVIDES THE BLANKING PULSE DURING APPROX. 0.5~2sec. WHEN SELECT THE SOURCE.

2) MODE SELECTION

(1) THE INPUT SIGNAL SOURCE OF ANALOG 1, ANALOG 2 AND TTL HAS MODE 1 OR 2, WHICH ARE AVAILABLE FOR THE FOLLOWING ADJUSTMENT ITEMS.

ADJUSTMENT ITEM	VIDEO		ANALOG 1		ANALOG 2								TTL		
	NTSC	PAL SECAM	MODE 1	MODE 2	MODE 1	MODE 2							MODE 1	MODE 2	
						PGA		VGA				MAC		CGA	EGA
H-WIDTH	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H-PHASE	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
V-HEIGHT	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
V-POSITION	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
BRIGHT	○	○	○		○								○		
CONTRAST	○	○	○		○								○		
COLOR	○	○	—		—								—		
TINT	○	—	—		—								—		
SHARPNESS	○	○	—		—								—		
COLORS	—		—		—								8/P16/ S16/64	P16	64
VOLUME	○														
BALANCE	○														
PURITY	○														

(2) THE SELECTION OF MODE 1 OR 2 IS SELECTABLE BY THE OPERATION OF FRONT PANEL SWITCH, WIRELESS REMOTE CONTROLLER AND WIRED REMOTE CONTROLLER.

(3) NTSC OR PAL/SECAM SIGNAL IS DISCRIMINATED BY VERTICAL REQUENCY.

6-5 WIRELESS REMOTE CONTROLLER

THE WIRELESS REMOTE CONTROLLER HAS THE FOLLOWING FUNCTIONS.

(1) POWER ON/OFF(SUB-SWITCH)

(2) SELECTION OF SOURCE/MODE

(3) DISPLAY CONDITION ADJUSTMENT

(4) ADDRESS NUMBER ENTRY AND CALL

(THE ADDRESS NUMBER MEANS NUMBER OF MONITOR WHEN THE MULTI-DISPLAY.)

(5) SUPERIMPOSE ON/OFF

(6) DEGAUSS ON

(7) COLOR SELECTION OF TTL/MODE1

(8) SELECTION OF COMPOSITE SYNC. AT ANALOG OR TTL INPUT

(9) ON SCREEN DISPLAY CALL/CLEAR

(10) ON SCREEN DISPLAY ON/OFF (DISPLAY OFF)

6-6 D/A CONVERTER

1) THE MPU OF IC222 POVIDES THE FOLLOWING SIGNAL TO D/A CONVERTER.

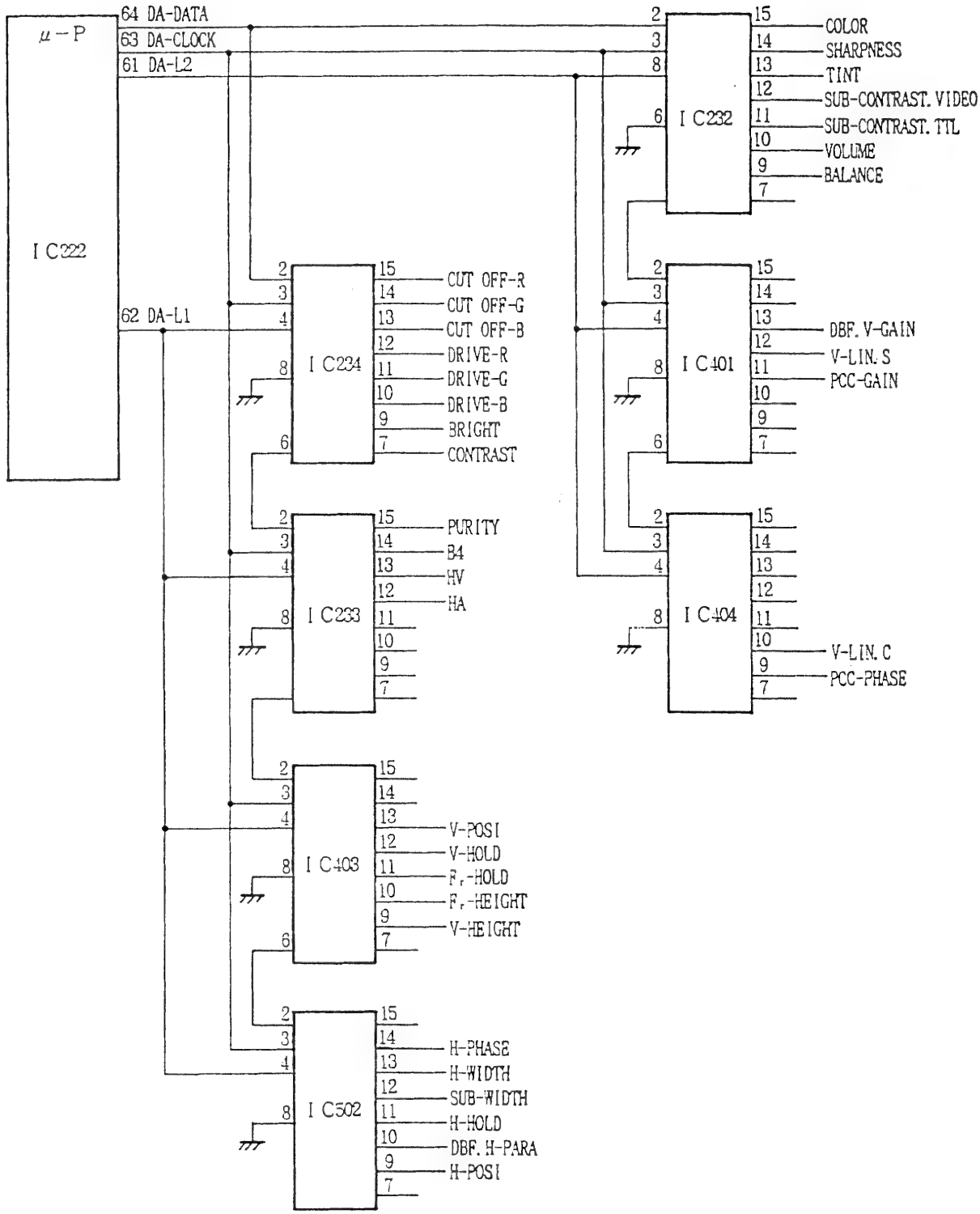
(1) DATA SIGNAL (⑭ PIN)

(2) CLOCK SIGNAL (⑬ PIN)

(3) LOAD SIGNAL (⑫, ⑪ PIN)

2) CONNECTION DIAGRAM AND OUTPUT SIGNAL OF D/A CONVERTER SHOW AS NEXT IS SEPARATED TO FOUR PAIR CIRCUITS(IC234, IC233, IC403, AND IC502) AND THREE PAIR CIRCUITS (IC232, IC401 AND IC404).

THESE CIRCUITS ARE CONTROLLED BY MPU OF IC222, THEN THEY ALTERNATELY PROVIDE THE OUTPUT SIGNAL EVERY ONE PERIOD OF LOAD SIGNAL.



3) THE PAIR OF FOUR D/A CONVERTERS ARE CONTROLLED BY LOAD SIGNAL 1(⑥③ PIN), AND THE PAIR OF THREE D/A CONVERTERS ARE CONTROLLED BY LOAD SIGNAL 2(⑥① PIN), ON MPU OF IC222.

4) CONCERNING BETWEEN D/A CONV. OUTPUT AND DISPLAY CONDITION

ITEM	D/A DATA(UP⟷DOWN)			DISPLAY CONDITION		
H-WIDTH	INC.	⟷	DEC.	NARROW	⟷	WIDE
SUB-WIDTH	INC.	⟷	DEC.	NARROW	⟷	WIDE
H-PHASE	INC.	⟷	DEC.	LEFT	⟷	RIGHT
H-POSI	INC.	⟷	DEC.	LEFT	⟷	RIGHT
V-HEIGHT	INC.	⟷	DEC.	NARROW	⟷	WIDE
V-POSI	INC.	⟷	DEC.	DOWN	⟷	UP
BRIGHT	DEC.	⟷	INC.	DARK	⟷	LIGHT
CONTRAST	DEC.	⟷	INC.	DARK	⟷	LIGHT
COLOR	DEC.	⟷	INC.	LIGHT	⟷	SHADE
TINT	INC.	⟷	DEC.	RED	⟷	GREEN
CUT-OFF(R)	INC.	⟷	DEC.	DARK	⟷	LIGHT
CUT-OFF(G)	INC.	⟷	DEC.	DARK	⟷	LIGHT
CUT-OFF(B)	INC.	⟷	DEC.	DARK	⟷	LIGHT
SHARPNESS	DEC.	⟷	INC.	SOFT	⟷	SHARP
VOLUME	DEC.	⟷	INC.	SMALL	⟷	LOUD
BALANCE	DEC.	⟷	DEC.	LEFT	⟷	RIGHT
PURITY	DEC.	⟷	INC.	NORTH	⟷	SOUTH
B4	INC.	⟷	DEC.	VOLTAGE DEC.	⟷	INC.
HIGH VOLTAGE	INC.	⟷	DEC.	VOLTAGE DEC.	⟷	INC.
V-HOLD	INC.	⟷	DEC.	FREQUENCY DEC.	⟷	INC.

6-7 READ OR WRITE OPERATION TO E²PROM

(1) IN BASICALLY, THE OPTIMUM DISPLAY DATA IS MEMORIZED TO E²PROM IN FACTORY.

(2) IN CASE OF NO DATA IN E²PROM, THE MONITOR DISPLAYS RASTER ACCORDING TO FLOW CHART IN SECTION 6-2

(3) IN CASE OF ANALOG 1/ANALOG 2(MODE 1)/TTL(MODE 1), THE ADJUSTMENT DATAS ARE AUTOMATICALLY MEMORIZED TO E²PROM WHEN OPERATES TO PUSH THE SWITCHES OF FRONT PANEL AND WIRELESS REMOTE CONTROLLER.
THEREFORE, THESE DATAS WILL BE STORAGED IN E²PROM AFTER TURN OFF THE POWER SWITCH OR TO SELECT THE OTHER SOURCES OR MODES.

(4) IN CASE OF VIDEO/ANALOG 2(MODE 2)/TTL(MODE 2), THE ADJUSTMENT DATA IS MEMORIZED ONLY TO PUSH THE BOTH SWITCHES OF "DEGAUSS" AND "CALL" AT THE SAME TIME.

(5) IN NORMALLY, ADJUSTMENT ITEMS ARE DISPLAYED ON THE SCREEN WHEN OPERATE TO PUSH THE FRONT SWITCHES OR WIRELESS REMOTE CONTROLLER.
HOWEVER, IF NECESSARY FOR THE FURTHER ADJUSTMENTS(FOR EXAMPLE, HIGH VOLT. OR B4 VOLT. etc.), IT IS NECESSARY TO SET UP S209 ON VIDEO BOARD.
(PLEASE REFER TO ADJUSTMENT SECTION.)

6-8 ON SCREEN DISPLAY

IC230 FOR ON SCREEN CHARACTER DISPLAY IS PROVIDED TO THE FOLLOWING SIGNALS FROM MPU OF IC222.

(1) DATA SIGNAL (⑰ PIN)
(2) CLOCK SIGNAL (⑯ PIN)
(3) STROBE SIGNAL (⑮ PIN)

ABOVE SIGNALS ARE USED FOR THE DISPLAY OF SCREEN FOR SOUCE/MODE, ADJUSTMENT ITEMS, ADJUSTMENT VALUE AND ADDRESS NUMBER.

6-9 EXTERNAL WIRED REMOTE CONTROL

1) THE EXTERNAL WIRED REMOTE CONTROL IS AVAILABLE FOR THE FOLLOWING CONTROLS.

(1) SELECTION OF EXT.(WIRED REMOTE CONTROL)/INT. (WIRELESS REMOTE CONTROL OR FRONT SWITCHES)
(2) POWER ON/OFF
(3) SOURCE/MODE SELECTION

} IT IS AVAILABLE ONLY EXT. SIGNAL.

2) SIGNAL DISCRIMINATION AND SELECTION

(1) THE SELECTION SIGNAL SHOWN AS NEXT IS DETEMINED BY COMBINATION THAT INPUT AND OUTPUT SIGNAL BETWEEN IC222 AND IC231.
(2) THE PIN ASSIGNMENT OF IC231 IS AS FOLLOWS.

IC231	LEVEL	SELECTION SIGNAL
⑬ PIN	L	EXTERNAL
	H	INTERNAL
⑫ PIN	L	POWER ON
	H	POWER OFF
④ PIN	L	VIDEO 1
③ PIN	L	VIDEO 2
② PIN	L	ANALOG 1
① PIN	L	ANALOG 2
⑮ PIN	L	TTL
⑭ PIN	L	MODE 1
	H	MODE 2

THEY ARE AVAILABLE ONLY TO SELECT THE EXTERNAL SIGNAL.

(3) IF NECESSARY FOR THE MANUAL DEGAUSSING, IT IS AVAILABLE THAT ⑬ PIN IS HIGH LEVEL AND ⑫ PIN IS LOW LEVEL.
HOWEVER, IF CONTINUOUSLY SELECT THE "INTERNAL" SIGNAL ON ⑬ PIN, IT IS NECESSARY TO DISCONNECT THE WIRED REMOTE CONTROLLER OR TO SELECT THE "INTERNAL" SIGNAL AFTER SELECT THE "POWER OFF" (⑫ PIN : H).

(4) THE SOURCE SELECTION SIGNAL HAS THE FOLLOWING PRIORITY.
VIDEO 1 > VIDEO 2 > ANALOG 1 > ANALOG 2 > TTL

(5) IT IS NOT AVAILABLE FOR THE WIRELESS REMOTE CONTROLLER AND POWER/SOURCE/MODE SWITCHES OF FRONT PANEL, WHEN SELECT THE EXTERNAL SIGNAL BY WIRED REMOTE CONTROLLER. (THE OTHER SWITCHES ARE AVAILABLE.)

§ 3. ADJUSMENT

1. GENERAL

1-1 USER CONTROL

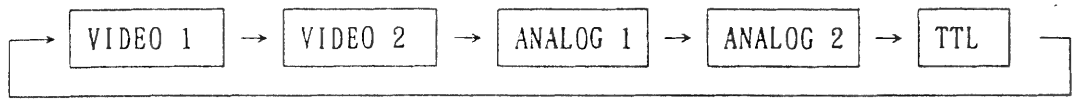
1) PUSH SWITCH

REMOTE/FRONT	SWITCH	PURPOSE
WIRELESS REMOTE CONTROLLER	POWER	SUB POWER SWITCH ON/OFF
	VIDEO 1	SOURCE SELECTION
	VIDEO 2	
	ANALOG 1	
	ANALOG 2	
	TTL	
	BRIGHT	BRIGHTNESS CONTROL SELECT. ADJUSTABLE BY UP/DOWN SW.
	CONTRAST	CONTRAST CONTROL SELECT. ADJUSTABLE BY UP/DOWN SW.
	VOLUME	SPEAKER SOUND CONTROL SELECT. ADJUSTABLE BY UP/DOWN SW.
	BALANCE	SPEAKER BALANCE CONTROL SELECT. ADJUSTABLE BY UP /DOWN SW.
	SET	ADJUSTMENT ITEM SELECT (REFER TO NEXT SECTION)
	UP/DOWN	ADJUSTMENT VALUE CONTROL
	NUMBER	ADDRESS NUMBER AND ADJUSTMENT ITEM SET UP
	ENTER	NUMBER ENTRY
	DEGAUSS	TO OPERATE THE MANUAL DEGAUSSING IN APPROX. 5sec.
	CALL/CLEAR	ADDRESS, SOURCE/MODE DISPLAY CALL
	DISPLAY OFF	SOURCE/MODE DISPLAY ON/OFF
FRONT PANEL	POWER	SUB POWER SWITCH ON/OFF
	SOURCE	SOURCE SELECTION(REFER TO NEXT SECTION)
	BRIGHT	BRIGHTNESS CONTROL SELECT. ADJUSTABLE BY UP/DOWN SW.
	CONTRAST	CONTRAST CONTROL SELECT. ADJUSTABLE BY UP/DOWN SW.
	VOLUME	SPEAKER SOUND CONTROL SELECT. ADJUSTABLE BY UP/DOWN SW.
	BALANCE	SPEAKER BALANCE CONTROL SELECT. ADJUSTABLE BY UP/DOWN SW.
	SET	ADJUSTMENT ITEM SELECT(REFER TO NEXT SECTION)
	CALL/CLEAR	ADDRESS NUMBER AND ADJUSTMENT ITEM SET UP
	DISPLAY OFF	SOURCE/MODE DISPLAY ON/OFF
	DEGAUSS	TO OPERATE THE MANUAL DEGAUSSING IN APPROX. 5sec.
	UP/DOWN	ADJUSTMENT VALUE CONTROL

2) SOURCE AND ADJUSTMENT ITEM SELECTION

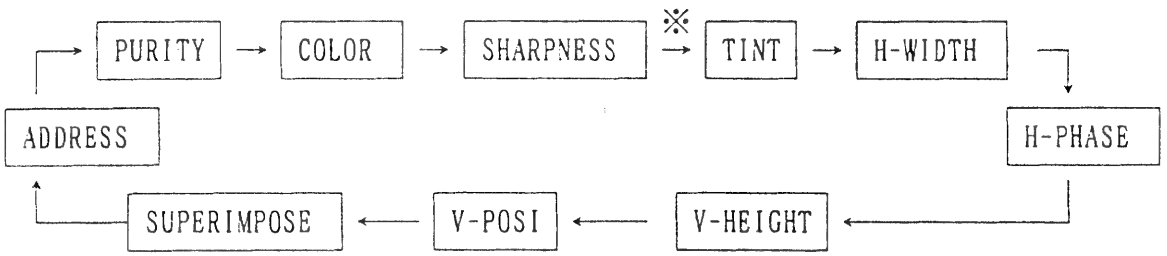
SOURCE AND ADJUSTMENT ITEMS CAN SELECT BY PUSH SWITCH WHICH IS CYCLICALLY DISPLAYED THE MENU ON SCREEN TO FOLLOWING.

(1) THE "SOURCE" SWITCH OF FRONT PANEL IS SELECTABLE TO FOLLOWING MENU AT ONE PUSH.



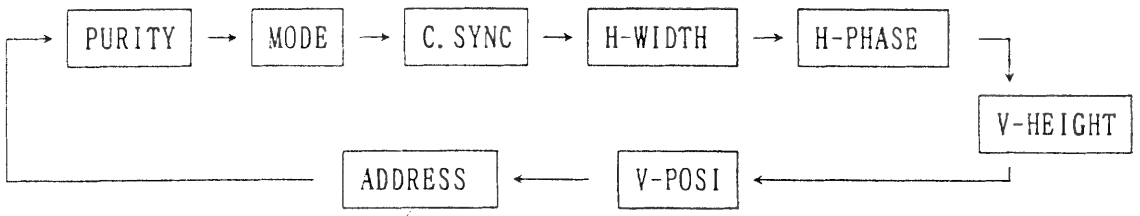
(2) THE "SET" SWITCH OF FRONT PANEL AND WIRELESS REMOTE CONTROLLER IS SELECTABLE TO FOLLOWING MENU IN EVERY SOURCE AT ONE PUSH.

<VIDEO>

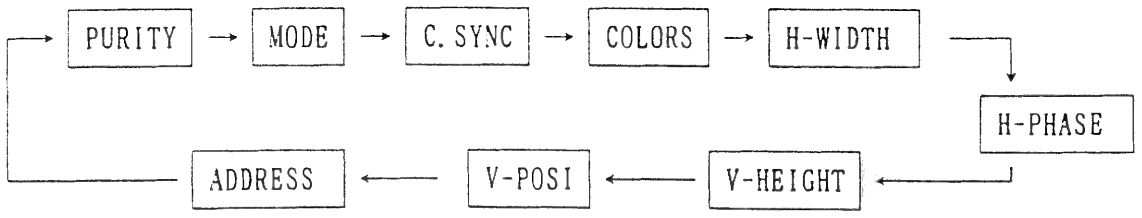


※MARK IS AVAILABLE ONLY NTSC.

<ANALOG>



<TTL>



(3) ADJUSTMENT ITEM

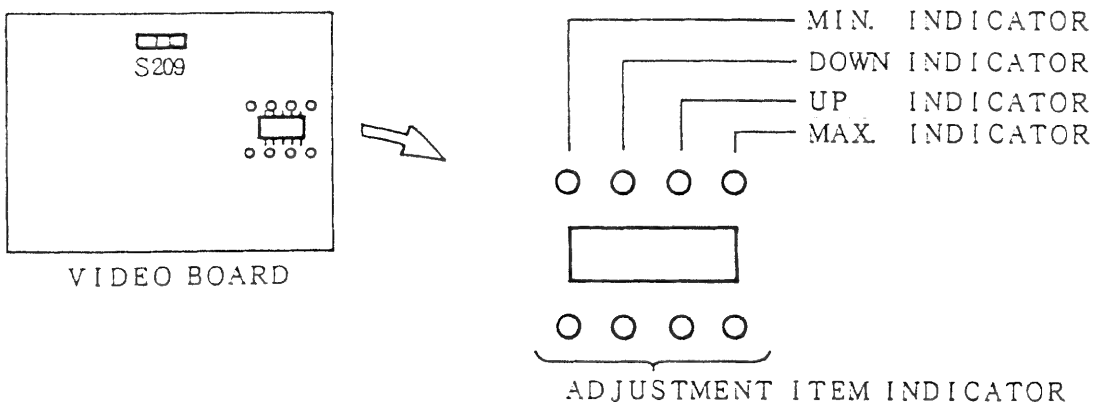
① PURITY	:	CANCEL COIL ADJUSTMENT FOR COLOR PURITY
② COLOR	:	LIGHT OR SHADE CONTROL OF RASTER
③ SHARPNESS	:	SHARP OR SOFT CONTROL OF RASTER
④ TINT	:	COLOR TONE CONTROL OF RASTER
⑤ H-WIDTH	:	HORIZONTAL RASTER SIZE CONTROL
⑥ H-PHASE	:	HORIZONTAL RASTER POSITION CONTROL
⑦ V-HEIGHT	:	VERTICAL RASTER SIZE CONTROL
⑧ V-POSI	:	VERTICAL RASTER POSITION CONTROL
⑨ SUPERIMPOSE	:	SUPERIMPOSE ON/OFF
⑩ ADDRESS.	:	ADDRESS NUMBER SET UP
⑪ MODE	:	MODE SELECTION
⑫ C.SYNC	:	AVAILABLE AT COMPOSITE SYNC. SIGNAL
⑬ COLORS	:	8/PASTEL16/SATURATED16/64 COLOR SELECTABLE

1-2 INTERNAL ADJUSTMENT

1) ACCESS TO INTERNAL ADJUSTMENT

(1) IN NORMALLY, USER CONTROL IS ACCESSABLE BY OPERATION OF FRONT PANEL SWITCHES OR WIRELESS REMOTE CONTROLLER, WHICH IS DISPLAYED THE MENU ON SCREEN.
HOWEVER, THE OTHER ADJUSTMENT ITEMS ARE NECESSARY TO SET UP THE INTERNAL SWITCH OF S209 ON VIDEO BOARD, WHICH WILL BE CHANGE THE FUNCTION OF FRONT SWITCHES FOR INTERNAL ADJUSTMENT.

(2) IT IS NECESSARY TO CONFIRM THE ADJUSTMENT STATUS BY LED ON VIDEO BOARD WHEN SET UP S209.



※ WHEN INDICATE THE BOTH LED OF MAX. AND MIN., IT MEANS CENTER.

2) COMPARISION TABLE BETWEEN FRONT SWITCHES AND INTERNAL ADJUSTMENTS

S209 CENTER	S209 LEFT	S209 RIGHT	INDICATION OF LOWER LED
POWER	H-POSITION	DBF H-PARA	○ ● ● ●
SOURCE	CUT-OFF-R	DBF V-GAIN	● ○ ● ●
BRIGHT	CUT-OFF-G	B4	○ ○ ● ●
CONTRAST	CUT-OFF-B	HIGH VOLT. (HV)	● ● ○ ●
VOLUME	DRIVE-R	(V-LIN. C)	○ ● ○ ●
BALANCE	DRIVE-G	————	● ○ ○ ●
SET	DRIVE-B	PCC-GAIN	○ ○ ○ ●
CALL/CLEAR	SUB-CONT. VIDEO	PCC-PHASE	● ● ● ○
DISPLAY OFF	SUB-CONT. TTL	H-HOLD	○ ● ● ○
DEGAUSS	SUB-WIDTH	V-HOLD	● ○ ● ○
DOWN	DOWN	DOWN	
UP	UP	UP	

NOTE)

(1) IT IS NECESSARY TO SELECT THE CENTER POSITION OF S209 FOR DATA ENTRY AFTER EACH ADJUSTMENT.

(2) THE DIRECTION OF S209 IS SEE FROM BACK COVER SIDE OF MONITOR.

(3) INDICATION OF LED : ○…ON, ●…OFF

2. ADJUSTMENT PROCEDURE

(CAUTION)

1) THE ADJUSTMENT DATA MAKES AN ENTRY TO E²PROM, WHEN SELECT THE CENTER POSITION OF S209.

   THEREFORE, IT IS NECESSARY TO SELECT THE CENTER POSITION OF S209 AT EVERY ADJUSTMENT.

2) TIMING DATA IS REFER TO SECTION 3.

2.1 B4 VOLTAGE ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.①, INPUT ONLY SYNC.

2) PROCEDURE :

(1) SELECT "TTL" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) SET S209 TO RIGHT POSITION ON VIDEO BOARD.

(4) SELECT "B4" ADJUSTMENT BY "BRIGHT" OF FRONT PANEL.

(5) CONNECT DC VOLTMETER BETWEEN "TP-3" AND CHASSIS GROUND(OR LEAD OF C940).

(6) ADJUST DC VOLTAGE FOR A DC 27.8±0.3V BY UP/DOWN SWITCH OF FRONT PANEL.

(7) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.2 HIGH VOLTAGE(HV) ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.①, INPUT ONLY SYNC.

2) PROCEDURE :

(1) SELECT "TTL" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) SET S209 TO RIGHT POSITION ON VIDEO BOARD.

(4) SELECT "HV" BY "CONTRAST" SWITCH OF FRONT PANEL.

(5) CONNECT HIGH VOLTMETER BETWEEN CRT ANODE AND CHASSIS GROUND.

(6) ADJUST HIGH VOLTAGE FOR A 32±0.3KV BY UP/DOWN SWITCH OF FRONT PANEL.

(7) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.3 H-HOLD ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.⑬, FULL WHITE RASTER

2) PROCEDURE :

(1) SELECT "TTL" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) SET S209 TO RIGHT POSITION ON VIDEO BOARD.

(4) SELECT "H-HOLD" BY "DISPLAY OFF" SWITCH OF FRONT PANEL.

(5) CONNECT OSCILLOSCOPE TO ⑫ PIN(OR TP-1) OF IC510, THEN MEASURING THE VOLTAGE. ALSO, CONNECT OSCILLOSCOPE TO ④ PIN(OR TP-2) OF IC510, THEN MEASURING THE VOLTAGE.
ADJUST ④ PIN(OR TP-2) VOLTAGE OF IC510 TO SAME VOLTAGE VALUE AS ⑫ PIN (OR TP-1)±0.05V(IN NORMALLY, APPROX. 2.8V) BY UP/DOWN SWITCH.

(6) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.4 V-HOLD ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.⑬, FULL WHITE RASTER

2) PROCEDURE :

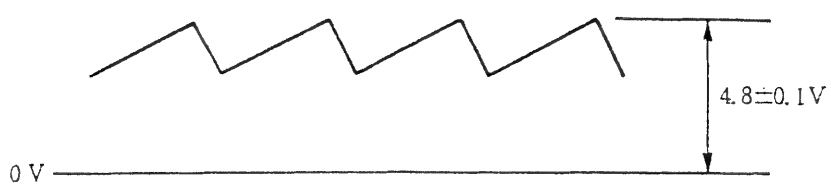
(1) SELECT "TTL" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) SET S209 TO RIGHT POSITION ON VIDEO BOARD.

(4) SELECT "V-HOLD" BY "DEGAUSS" SWITCH OF FRONT PANEL.

(5) CONNECT OSCILLOSCOPE TO ③ PIN(OR TP-3) OF IC406 AND ADJUST TO OBTAIN THE FOLLOWING WAVE FORM BY UP/DOWN SWITCH.



(6) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.5 H-POSITION ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.⑭, FULL WHITE RASTER

2) PROCEDURE :

(1) SELECT "TTL" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) SET S209 TO LEFT POSITION ON VIDEO BOARD.

(4) SELECT "H-POSITION" BY "POWER" SWITCH OF FRONT PANEL.

(5) ADJUST THE HORIZONTAL RASTER POSITION BY UP/DOWN SWITCH OF FRONT PANEL TO CENTER OF SCREEN.

(6) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.6 PCC-PHASE/PCC-GAIN ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.③, FULL WHITE RASTER

2) PROCEDURE :

(1) SELECT "TTL" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) SET S209 TO RIGHT POSITION ON VIDEO BOARD.

(4) SELECT "PCC-PHASE" BY "CALL/CLEAR" SWITCH AND "PCC-GAIN" BY "SET" SWITCH OF FRONT SWITCH.

(5) ADJUST TO CORRECT THE RASTER DISTORTION BY UP/DOWN SWITCH OF FRONT PANEL.

(6) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.7 SUB-WIDTH ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.⑪, FULL WHITE RASTER

2) PROCEDURE :

(1) SELECT "ANALOG 2" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) SELECT "H-WIDTH" BY "SET" SWITCH OF FRONT PANEL, AND ADJUST TO OBTAIN THE MAX. HORIZONTAL RASTER BY UP/DOWN SWITCH OF FRONT PANEL.

(4) SET S209 TO LEFT POSITION ON VIDEO BOARD.

(5) SELECT "SUB-WIDTH" BY "DEGAUSS" SWITCH OF FRONT PANEL.

(6) ADJUST HORIZONTAL RASTER SIZE FOR A 680±10mm BY UP/DOWN SWITCH OF FRONT PANEL.

(7) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.8 WHITE BALANCE ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.⑨, WINDOW PATTERN

2) PROCEDURE :

(1) SELECT "ANALOG 2" BY "SOURCE" SWITCH OF FRONT PANEL.

(2) SELECT "MODE 2" BY "SET" SWITCH OF FRONT PANEL.

(3) ADJUST "BRIGHT" SWITCH TO CENTER VALUE(INDICATE "0") AND "CONTRAST" SWITCH TO MAX. VALUE(INDICATE "MAX") BY UP/DOWN SWITCH OF FRONT PANEL.

(4) ADJUST SCREEN CONTROL ON FBT TO OBTAIN DIMLY BACK RASTER.

(5) SET S209 TO LEFT POSITION ON VIDEO BOARD.

(6) SELECT "CUT-OFF-R", "CUT-OFF-G", "CUT-OFF-B" BY "SOURCE", "BRIGHT", "CONTRAST" SWITCH OF FRONT PANEL.

(7) ADJUST "CUT-OFF-R, G, B" TO MIN. VALUE BY UP/DOWN SWITCH OF FRONT PANEL.

(8) DISCONNECT THE RGB VIDEO SIGNAL.(INPUT ONLY SYNC. SIGNAL.)

(9) SET S209 TO CENTER POSITION.

(10) ADJUST "BRIGHT" SWITCH TO OBTAIN APPROX. 3nits BY UP/DOWN SWITCH OF FRONT PANEL.

(11) SET S209 TO LEFT POSITION.

(12) SELECT "CUT-OFF-R, G, B" AND ADJUST TO OBTAIN THE PURE WHITE OF X=0.283/Y=0.297 OF COLOR COLOR COORDINATION BY UP/DOWN SWITCH.

(13) AFTER ABOVE ADJUSTMENT, SET S209 TO CENTER POSITION.

(14) ADJUST "BRIGHT" SWITCH TO CENTER VALUE (INDICATE "0") BY UP/DOWN SWITCH.

(15) INPUT ONLY GREEN VIDEO SIGNAL.

(16) SET S209 TO LEFT POSITION, THEN SELECT "DRIVE-G" BY "BALANCE" SWITCH OF FRONT PANEL.

(17) ADJUST "DRIVE-G" TO OBTAIN APPROX. 110nits LUMINANCE BY UP/DOWN SWITCH OF FRONT PANEL.

(18) INPUT R, G, B VIDEO SIGNAL AND SELECT "DRIVE-R, G, B" BY "VOLUME", "BALANCE", "SET" SWITCH OF FRONT PANEL THEN ADJUST TO OBTAIN THE PURE WHITE OF X=0.283/ Y=0.297 OF COLOR COORDINATION BY UP/DOWN SWITCH.

(19) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.9 SUB-CONTRAST ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.⑨, WINDOW PATTERN

2) PROCEDURE :

(1) SELECT "TTL" BY "SOURCE" SWITCH.

(2) SELECT "MODE 1" BY "SET" SWITCH.

(3) SET S209 TO LEFT POSITION AND SELECT "SUB-CONT" BY "DISPLAY-OFF" SWITCH OF FRONT PANEL, THEN ADJUST TO OBTAIN APPROX. 150nits LUMINANCE BY UP/DOWN SWITCH OF FRONT PANEL.

(4) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

NOTE) IF NECESSARY, IT IS AVAILABLE TO USE THE LUMINANCE METER OR COLOR ANALYZER, REGARDING ITEM 2.8 AND 2.9.

2.10 DBF-H, DBF-V ADJUSTMENT

1) INPUT SIGNAL : TIMING NO.⑩, WINDOW PATTERN

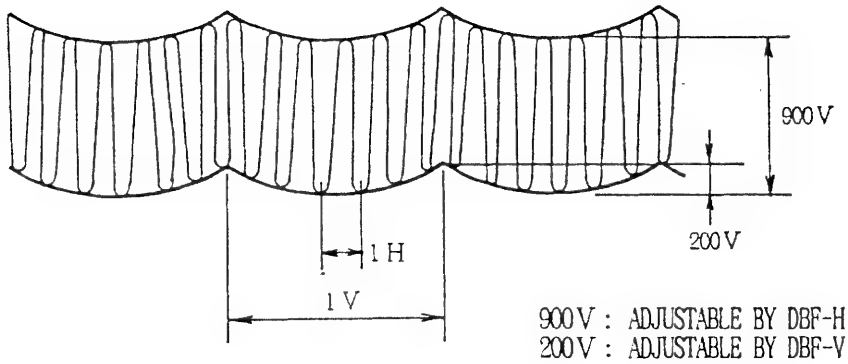
2) PROCEDURE :

(1) SELECT "ANALOG 2" BY "SOURCE" SWITCH.

(2) SELECT "MODE 2" BY "SET" SWITCH.

(3) SET S209 TO RIGHT POSITION AND TO SELECT "DBF-H" AND "DBF-V" BY "POWER" AND "SOURCE" SWITCH OF FRONT PANEL.

(4) CONNECT OSCILLOSCOPE WITH HIGH VOLTAGE PROBE TO "DF" TERMINAL ON DBF BOARD, THEN ADJUST TO OBTAIN THE FOLLOWING WAVE FORM BY UP/DOWN SWITCH.



900V : ADJUSTABLE BY DBF-H
200V : ADJUSTABLE BY DBF-V

(5) AFTER ADJUSTMENT, SET S209 TO CENTER POSITION FOR DATA ENTRY.

2.11 RASTER ADJUSTMENT

1) INPUT SIGNAL : REFER TO THE FOLLOWING TABLE.

2) PROCEDURE :

(1) SELECT "H-PHASE" BY "SET" SWITCH, THEN ADJUST THE HORIZONTAL RASTER POSITION BY UP/DOWN SWITCH TO CENTER POSITION.

(2) SELECT "H-WIDTH" BY "SET" SWITCH, THEN ADJUST THE HORIZONTAL RASTER SIZE FOR A 645±10mm BY UP/DOWN SWITCH.

(3) SELECT "V-POS" BY "SET" SWITCH, THEN ADJUST THE VERTICAL RASTER POSITION BY UP/DOWN SWITCH.

(4) SELECT "V-SIZE" BY "SET" SWITCH, THEN ADJUST THE VERTICAL RASTER SIZE FOR A 485±10mm BY UP/DOWN SWITCH.

(5) AFTER ADJUSTMENT ITEM (1) TO (4), TO PUSH THE BOTH SWITCHES OF "CALL/CLEAR" AND "DEGAUSS" THEN CONFIRM TO THE "MEMORIZED" DISPLAY ON EACH TIMING OF THE FOLLOWING TABLE.

(6) ADJUSTMENT CONDITION ··· BRIGHT : CENTER(0)
CONTRAST : MAX.

DESCRIPTION	TIMING	PATTERN	SOURCE	MODE	S209
CGA	①	FULL WHITE	TTL	2	CENTER
EGA	③	↓	TTL	↓	↓
PGA 400L	⑤	↓	ANALOG 2	↓	↓
PGA 480L	⑥	↓	↓	↓	↓
VGA 350L	⑦	↓	↓	↓	↓
VGA 400L	⑧	↓	↓	↓	↓
VGA 480L	⑨	↓	↓	↓	↓
VGA 1024L	⑩	↓	↓	↓	↓
MAC II	⑫	↓	↓	↓	↓
ANALOG 1	⑨	↓	ANALOG 1	1	↓
ANALOG 1	⑨	↓	ANALOG 1	2	↓
ANALOG 2	⑨	↓	ANALOG 2	1	↓
TTL	⑨	↓	TTL	1	↓
VIDEO	NTSC	CROSS HATCH	VIDEO 1	——	↓
VIDEO	PAL	CROSS HATCH	VIDEO 2	——	↓

※ IN CASE OF VIDEO SIGNAL, IT SHOULD BE CONTROLLED TO OBTAIN OPTIMUM OVER SCANNING RASTER BY "H-WIDTH" AND "V-SIZE" SWITCHES.

2.12 SUB-CONTRAST VIDEO ADJUSTMENT

1) INPUT SIGNAL : NTSC, COLOR BAR PATTERN

2) PROCEDURE :

(1) SELECT "VIDEO 1" BY "SOURCE" SWITCH.

(2) ADJUST "BRIGHT" AND "CONTRAST" TO FOLLOWING.

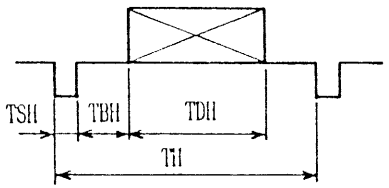
BRIGHT···CENTER(0), CONTRAST···MAX

(3) SET S209 TO LEFT POSITION AND SELECT "SUB-CONT VIDEO" BY "CALL/CLEAR" SWITCH OF FRONT PANEL.

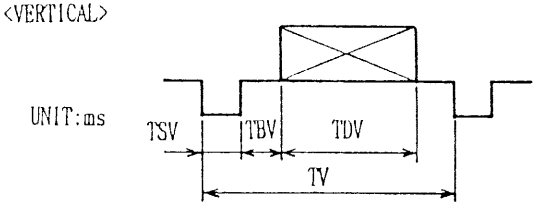
(4) ADJUST THE LUMINANCE FOR APPROX. 230nits ON CENTER OF WHITE WINDOW OF COLOR BAR PATTERN BY UP/DOWN SWITCH.

3. TIMING CHART DATA

<HORIZONTAL>



<VERTICAL>

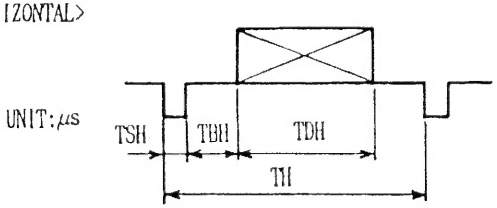


No.	DOT IN DISPLAY	CHR. SIZE	TH	TSH	TBH	TDH	TV	TSV	TBV	TDV	H. SYC.	V. SYC.	I/NI	REMARKS
①	637	8× 8	63.500	4.500	8.950	44.500	16.640	0.190	2.159	12.700	POS.	POS.	NI	CGA
②	749	8× 8	63.500	4.500	4.500	52.300	16.640	0.190	0.762	15.620	POS.	POS.	NI	CGA
③	640	10×10	45.760	4.950	1.640	39.500	17.000	0.600	0.103	16.300	NEG.	POS.	NI	EGA
④	640	10×10	46.400	4.950	2.400	39.500	17.000	0.600	0.103	16.300	NEG.	POS.	NI	EGA
⑤	640	10×10	32.800	4.480	2.720	25.600	16.660	0.066	2.099	13.120	POS.	POS.	NI	PGA 400
⑥	640	10×10	32.800	4.480	2.720	25.600	16.660	0.066	0.787	15.740	POS.	POS.	NI	PGA 480
⑦	640	10×10	31.778	3.813	1.907	25.422	14.268	0.064	1.907	11.122	NEG.	POS.	NI	VGA 350
⑧	640	10×10	31.778	3.813	1.907	25.422	14.268	0.064	1.111	12.711	POS.	NEG.	NI	VGA 400
⑨	640	10×10	31.778	3.813	1.907	25.422	16.683	0.064	1.048	15.253	NEG.	NEG.	NI	VGA 480
⑩	1024	10×10	28.153	3.920	1.250	22.800	11.500	0.113	0.577	10.810	POS.	POS.	NI	VGA 1024
⑪	640	8× 8	40.280	3.040	4.040	30.400	18.040	0.320	1.280	16.120	NEG.	NEG.	NI	PC 98
⑫	640	8× 8	28.571	2.116	3.157	21.164	15.000	0.086	1.114	13.714	POS.	POS.	NI	MAC II
⑬	653	8× 8	40.000	3.000	3.000	31.000	16.666	0.295	0.739	14.892	POS.	POS.	NI	TEST
⑭	709	10×10	45.760	1.000	1.000	43.760	17.000	0.600	0.103	16.300	NEG.	POS.	NI	TEST

NI : NON INTERLACE

3. TIMING CHART DATA

<HORIZONTAL>



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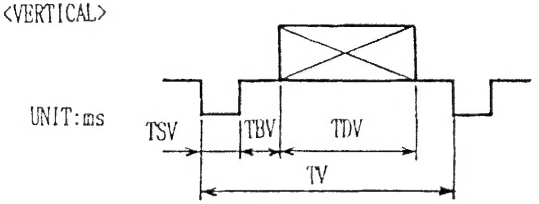

No.	DOT IN DISPLAY	CHR. SIZE	TH	TSH	TBH	TDH	TV	TSV	TBV	TDV	H. SYC.	V. SYC.	I/NI	REMARKS
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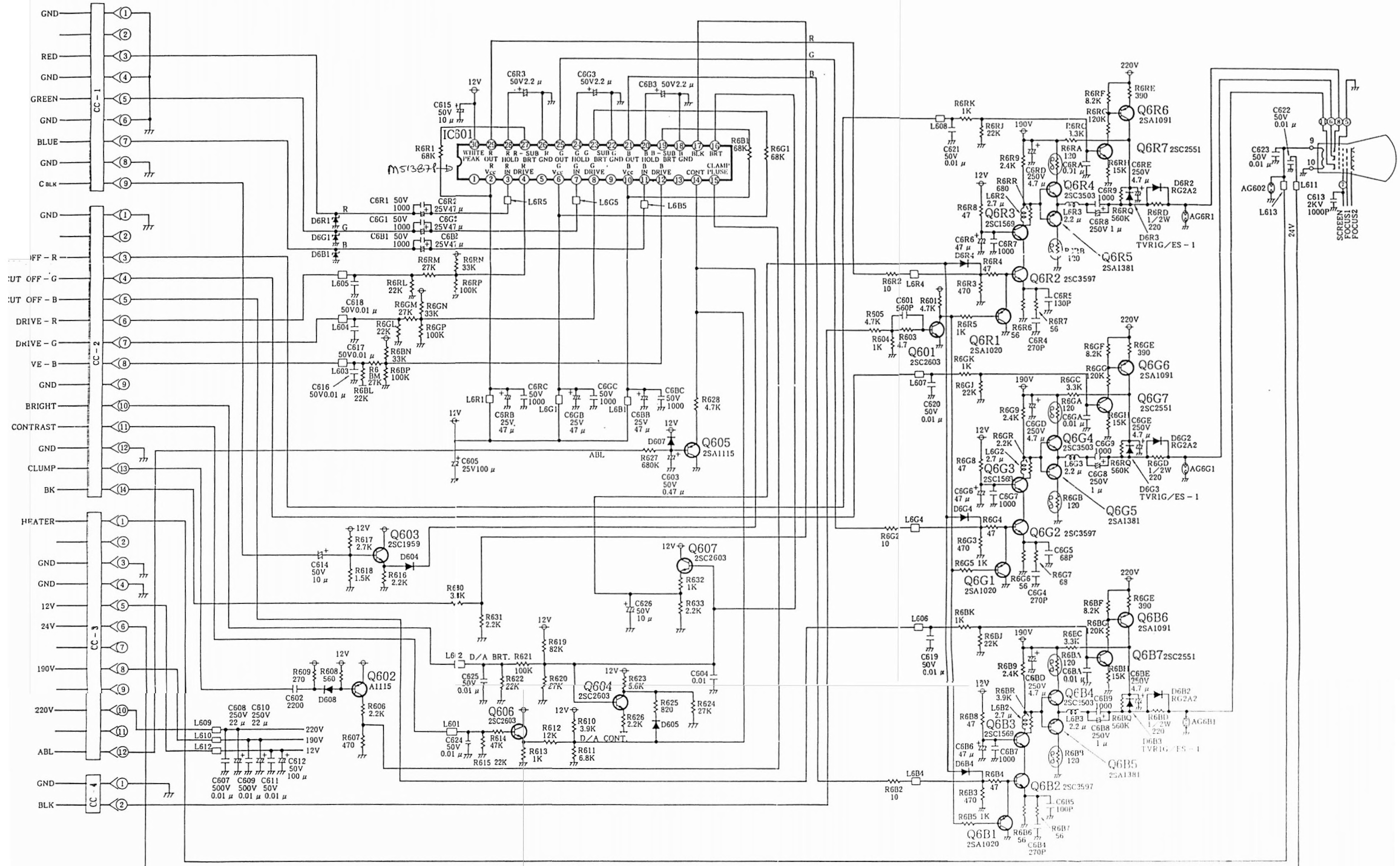
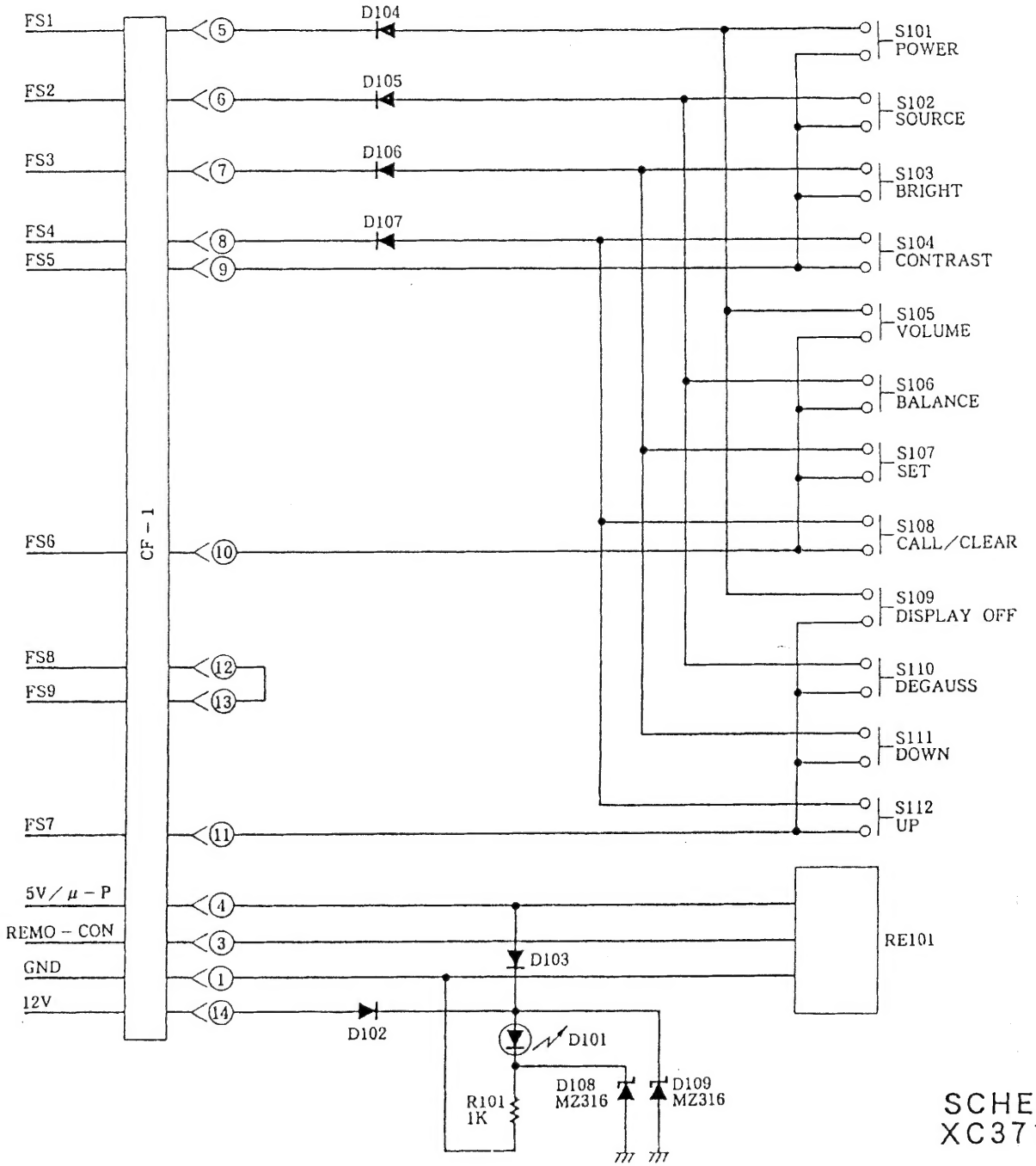
⑭	709	10×10	45.760	1.000	1.000	43.760	17.000	0.600	0.103	16.300	NEG.	POS.	NI	TEST

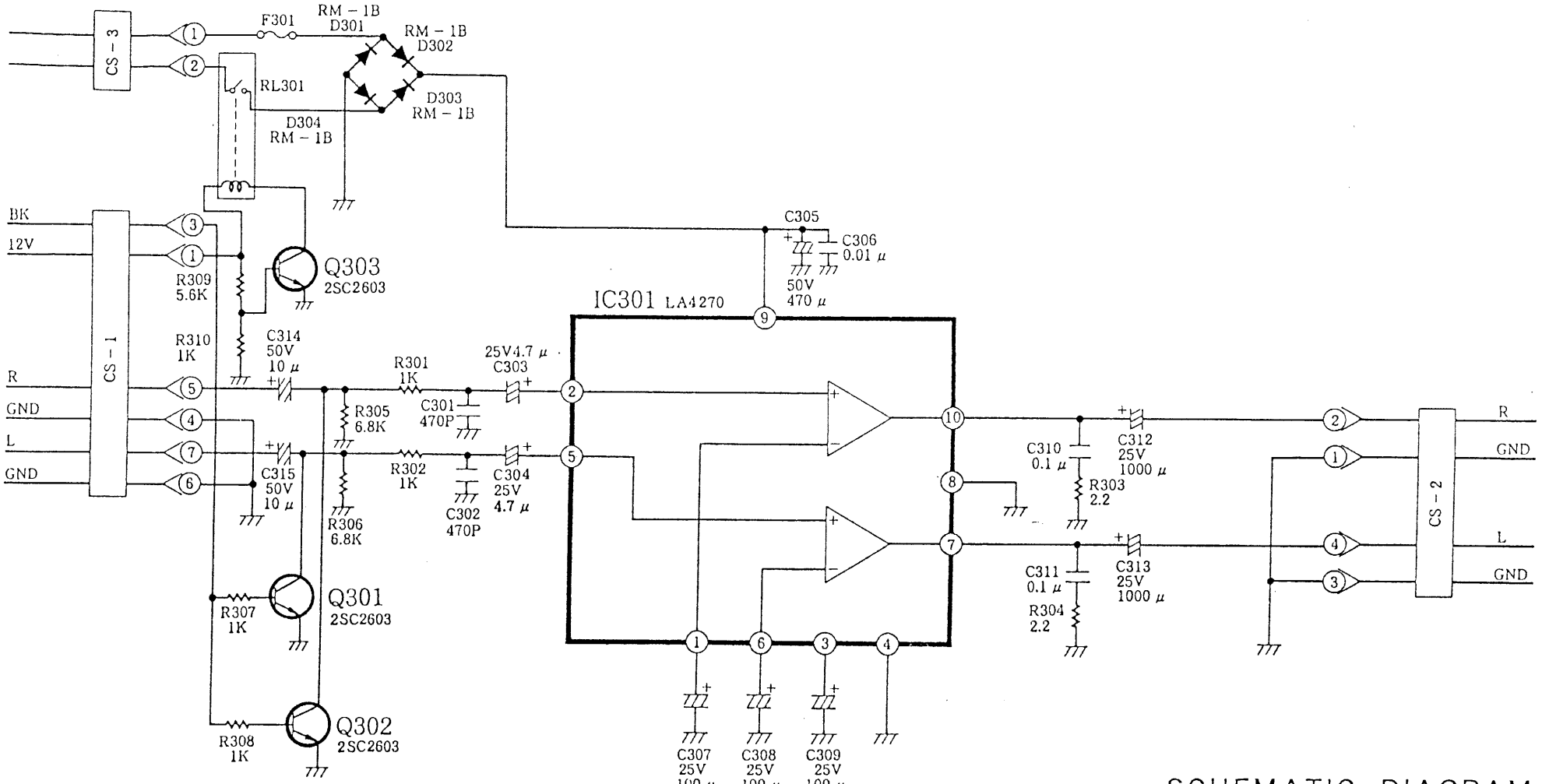
NI : NON INTERLACE



SCHEMATIC DIAGRA
XC3715C (CRT)



SCHEMATIC DIAGRAM
XC3715C (FRONT – VR)



SCHEMATIC DIAGRAM
XC3715C (AUDIO)